The Excavating Engineer

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Digging the Price Canyon Road, Utah

A New Scenic Highway Being Built by Carbon County. Heavy Sidehill Operation up Price Canyon. Description of Revolving Shovel Operation

WHERE the old Midland Trail winds its way up Price Canyon, Utah, along the eastern slopes of the Wasatch Range, the Road Commissioners of Carbon County, Utah are building a new highway which bids fair to take its place among the greatest of scenic roads.

This highway which is a part of the Midland Trail will give the most direct route between eastern Utah and Salt Lake City, The stretch now under construction follows the Price River, through the Canyon of the same name between Helper in Carbon County and Colton just across the county line in Utah County, a district rich in coal.

The Wasatch Range which forms in fact, a part of the Rocky Mountain system, is at this point most picturesque. But with this picturesqueness and rugged grandeur come difficulties to the engineer. The road is for the most part a "dugway" road cut into the mountain sides. The geological formation is a sedimentary deposit made up of sandstone ledges with intervening layers of shale and slate formation. No grade will exceed six per cent. The road parallels the main line of the Denver and Rio Grande Railroad. The town Helper, indeed getting its name from the fact that in the early days it was here at the bottom of the heavy climb up the Canyon, that "helper" locomotives had their home.

Description of Work

The ruggedness of the country and the character of the material encountered at once made it evident that the road could not be built economically without steam shovel equipment. Consequently after due consideration and investigation, the Carbon County Road Department bought a Bucyrus 14-B revolving shovel, equipped with a ⅔-yard dipper and mounted on caterpillars. This shovel arrived at Cameron two miles north of Castle Gate, where the excavation started, the last of September 1919, and work actually started on Oct. 1st.

Castle Gate which is three miles northwest of Helper gets its name from the castle-like appearance of the canyon. The valley here being narrow with the cliffs rising abruptly ten hundred to twelve hundred feet on both sides.

The length of the road which is to be rebuilt is seven miles.

Shovel Operation

The work actually consists of widening and grading the dugway or hillside road to a width of twenty-one feet. Ninety per cent of the work on the average is overcasting. There are places, however, where twenty-five to fifty per cent will be used for fills. Here the material is loaded into dump wagons and hauled to the fill.

The shovel started out of Cameron, working north towards Salt Lake City. It then encountered a steep hill with a grade of fifteen per cent which over a distance of about 700 feet was to be cut to 6 per cent. This was accomplished by making a ten-foot cut at the upper end and a heavy fill at the lower end. It was when the shovel was working in this cut that the accompanying photographs were taken.

Climbing a Fifteen Per Cent Grade

To take this cut to the best advantage, it was decided to move the shovel up the hill to the crest and dig back down the hill. This required the shovel to climb a fifteen per cent grade, seven hundred feet. It accomplished this with its powerful caterpillar traction with no trouble.

Character of Material Encountered

The material encountered varied from loose dirt to solid rock. A very considerable portion of it however, consisted of dirt containing large boulders, which in some instances were cemented together. The boulders at times ran as large as five tons. These were cleverly handled by the operator "Doc" Doherty and by E. D. Harris, who succeeded him later in the season. Both proved themselves artists at nosing them out and rolling them down the hill side.

At times the shovel butted shale ledges, which were handled without the use of powder. In places immense boulders were encountered. There con-

Starting to Dig

Getting Her Nose Into It

The Final Shove

Overcasting

Bucyrus 14-B revolving shovel in operation. Note the character of the material it is handling without blasting. "Doc" Doherty at the levers.

siderable blasting was done. These boulders were split by explosives, the rocks being drilled and the charge shot by battery. The character of the work has not warranted large yardages, as it has been for the most part scratch work.

Water, Fuel and Labor

The operation of the shovel took four men; an engineer, a fireman and two men around the shovel for handling the explosives, etc. In addition, one man and a team supplied the shovel with water and coal. The water was brought to the shovel in a tank wagon from the river, a distance of one thousand feet. The coal was obtained from a mine about two miles away. Slack coal was used at $2.00 per ton. A night watchman was also employed. There were nine men in all on the job with wages from $5.50 to $8.00 per day.

Value of Revolving Shovel for This Work

The revolving shovel has proved itself the only machine for this class of work. It is powerful and yet easily handled. The caterpillar traction furthermore has many advantages. The shovel may be moved easily from place to place and from one part of the job to another. It has proved itself a remarkable hill climber.

Martin Jacobson — Contractor

The work is being done by the Road Department of Carbon County. The County furnishing the shovel and Mr. Martin Jacobson doing the work on a yardage basis, furnishing the balance of the tools and equipment. Mr. Jacobson is well known in this part of the country.

Work was shut down about December 20, 1919 on account of winter, but it is expected that it will start again in early spring. The work will be finished by the early part of 1921.

Object of Widening Road

The object of widening this road is to put the Midland Trail in perfect condition through Price Canyon, so as to make it attractive for the many tourists motoring through the country. It is the ultimate aim of the present board of County Commissioners, Mr. Albert Bryber, Mr. Emil Ostlund, and Mr. A. E. Gibson to make the Midland Trail famous throughout their country as the best road across the continent and traversing regions where the most picturesque scenery on the entire route will be found. County Commissioners from adjoining counties have promised to co-operate along this line and when the plan is completed there is no question but what the Midland Trail will be the best route across the Continent.

Well in to the Cut at the Deepest Point, Showing Price River Below

It is due to the energy and enthusiasm of the above named county commissioners that this project has been made possible.

Mr. F. S. Dunlevy, County Surveyor, and Road Engineer of Carbon County has this work directly in charge and under his able supervision much work has been accomplished in a short time. During 1920 it is expected that with the use of the Bucyrus shovel a new record in road building work will be set.

Looking North. Taken at the Start of the 10-foot Cut

Ike Soles, who has returned from a contractor's convention, reports that cellars 'll be wider an' longer th' comin' season.

— *Milwaukee Sentinel.*

A Disagreeable Job

A washerwoman applied for help of a gentleman, who gave her a note to the manager of a certain club. It read as follows: "Dear Mr. X: — This woman wants washing."

Very shortly afterwards the answer came back: "Dear Sir:— I dare say she does, but I don't fancy the job." — *Ideal Power.*

Head Work

"Maria, you'll never be able to drive that nail with a flat iron. For heaven's sakes use your head," admonished Mr. Stubkins. And then he wondered why she would not speak to him the rest of the day. — *Ideal Power.*

70-C Bucyrus shovel chaining out rocks, weighing about 13 tons apiece and loading them into 6-yard Western cars

Two Bucyrus Shovels in Operation Loading 6-yard Cars

General View of Steam Shovel Work

Steam Shovel Work under Way, Pott's Hill Reservoir, Metropolitan Department of Public Works, Sydney, New South Wales, Australia.

Reservoir Excavation Near Sydney, Australia

Description of the Pott's Hill Reservoir, and the Operation of American Equipment Thereon

THE Metropolitan Board of Water Supply and Sewerage of Sydney, Australia, have constructed at Pott's Hill near that city, a new reservoir which will provide an additional storage capacity for the city of Sydney. The excavation work on this new reservoir is of particular interest as it exemplifies a method of operation not at all common in that country.

A good percentage of large undertakings involving considerable yardage was, as a rule, handled by team work. This work, however, was done by an American steam shovel and dragline outfit with dump cars and locomotives.

Bucyrus 70-C Steam Shovel Loading a 9-car train with a Ruston Proctor Navvy on the left.

The Commonwealth Engineer, one of the leading engineering publications in Australia, has published an extensive description of this installation. We are indebted to it for much of the information contained herein.

Description of Reservoir

The existing reservoir acts as a balance reservoir; the new one will fulfil the same function and at the time provide additional storage capacity in case of emergency. The capacity will be 150,000,000 gallons, and a total area of approximately forty-eight acres will be covered. The depth of water will be as shallow as weed growth and health requirements permit in order to take the fullest possible advantage of the available head. The pipes from the pipe head will be tapped at a point opposite one corner of the new reservoir, and the water will flow through a concrete carrier connecting with a large number of inlet valves. The water will then travel the length of the reservoir before reaching the outlet valves; by this means the fullest advantage is taken of the practically still body of water for settlement. The outlet valves connect with another concrete carrier similar to that on the inlet side, and this also skirts the edge until it meets the inlet carrier, at which point it turns off to connect with the existing reservoir and the pipe lines. A suitable arrangement of bulk heads is provided in the carriers to permit of passing the water straight through, as would be necessary, for instance, when cleaning out the reservoir.

The whole of the walls and floor will be of concrete, reinforced where necessary. Double walls around those sides where the carriers are required will constitute the latter. The floor will have just sufficient slope over the greater part of its area to cause the water to run on its surface, and a valley will be formed adjacent to one of the walls for cleaning operations. Directing ribs in this valley will assist in

the collection of weeds, the bulk of which will be lifted to the coping level and thrown on a dump, whilst the final effluent will flow out through openings provided for the purpose.

The Equipment Used

The bulk of the excavation was carried out with the help of two 70-C Bucyrus steam shovels, two Vulcan locomotives and two Manning-Wardle locomotives. A class-14 Bucyrus dragline was also used. Other and smaller plant was also used, and some manual and team work was done in addition. Fifty-two six-yard Western dump cars and seven miles of sixty-pound track were used to get rid of the spoil. Some of the dump was worked by hand labor and some by means of a spreader car.

"place" measurement, heaped up. The dump-cars are side tipping. The tipping of a whole train is readily effected by one man striking the release gear of each car as the train moves past him along the dump.

Spreading on the Dump

A part of the dump was spread by hand and a part by means of a spreader car. This latter was simply a car provided with an adjustable side wing. After the trucks have been tipped the train returns along the dump, drawing the spreader car with it, and thus the freshly tipped heaps were levelled off. The adjustment of the side wing of the spreader, and the number of journeys necessary, depended on the class and condition of the spoil and the distance from

A 70-C Digging Shale and Heavy Clay

The 70-C shovels were of the standard type, equipped with 2½ cubic yard dippers and mounted on standard-gauge trucks.

The Vulcan locomotives were of the four-wheel standard-gauge, saddle-tank type, with cylinders twelve inch by eighteen inch. This class of locomotive has been found extremely useful for all kinds of contracting work as with its short wheelbase it can negotiate 30 feet radius curves, and the compensating bar equalizes the load on each wheel and keeps the engine on the rails with the worst laid track. All parts are readily accessible—a point much to be desired in a contractor's locomotive.

The Western dump-cars used were of six yards capacity, holding approximately five cubic yards

the track to which it had to be spread. The spreader in this instance had a reach of about ten feet from the outer rail. It therefore was not necessary to shift the track very frequently.

Steam Shovel Operation

The steam shovel operation was similar to the method commonly employed in this country. "The Commonwealth Engineer" describes it in part as follows:

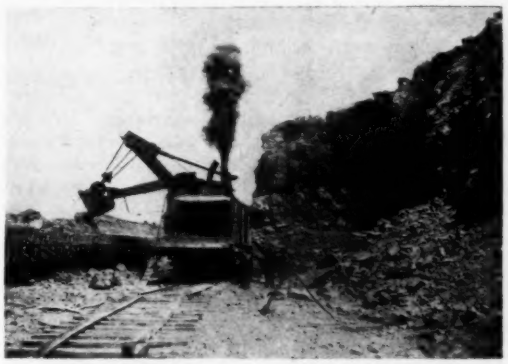
"As the whole success of steam shovel excavation work depends upon keeping the machines fully occupied throughout the working shift, and as it is essential in accomplishing this to provide a comparatively uninterrupted supply of empty trucks, the

disposition of the roads, switches and dumps must be carefully considered. Poor roads, inconvenient switching facilities, and excessively long runs to the dumps will cause costly delays. Insufficient trucks or engine power, and anything but prompt handling at the dump, will also cause trouble some waiting at the shovels. The whole of the dump-car system at Pott's Hill was designed in such a manner as to provide good facilities for the continuous operation of the shovels, and whatever delays occurred were mostly attributable to unfavorable weather or to such repairs as are inevitable on work of this nature. Minor repairs which can be foreseen are usually arranged to be carried out in luncheon hour, or at any time when not affecting the output of shovel.

"When working upon an eighteen-foot face composed of four feet of clay and fairly compact but friable shale (which would have meant stiff work for hand picks), and output of 2650 cubic yards, 'place' measurement, was obtained from one shovel in the eight and three-quarter hour shift. Under the best conditions loading was seven swings in two minutes.

"Unfortunately, the cost figures of the actual excavation and haulage and dumping, are not available separately. However, it may be stated that one Bucyrus shovel handled 580,589 cubic yards at a cost of 1/ per yard dumped, and the other Bucyrus shovel handled 440,907 cubic yards at a cost of 1/ 1½ per yard dumped. It is estimated that only about 2½d. should actually be debited against the shovels, as the remainder of the cost was incurred in hauling, dumping, etc. Above figures do not include interest and depreciation, but all other expenses, as wages, fuel, stores, repairs and supervision are covered.

"About two feet has been left on the floor of the reservoir to be cleaned up just before concreting is done, so that a sound bottom will be obtained.



Showing the Character of Digging Encountered

Otherwise the bottom would be broken up by the weight of the shovels and the action of the weather. The last two feet will be taken off by a class-14 Bucyrus dragline. Whereas the shovels work over the floor which they prepare, the dragline works behind itself — i. e., it travels on the original surface and digs over the ground it leaves behind. The same dragline will be used to dig the wall trenches.

"The class of material handled throughout varied from clay and slate to solid rock. The rock, of course, necessitated shooting, but the shovels are capable of getting out very large pieces. One piece taken out was estimated to weigh thirteen tons. This was too large to go into dipper, and had to be chained out."

How to Blast Hardwood Stumps

The great majority of the best grade of wild land in the northern part of this country is "hardwood land" and consequently, the great volume of stumps to be gotten rid of are hardwood stumps. By "hardwood stumps" we mean maple, beach, birch, hemlock, and basswood.

There are several reasons why the use of dynamite is prevalent, the main one of which is economy. And since economy is the object of blasting, it naturally follows that the economic use of blasting supplies is of paramount importance.

It has been found that in the blasting of hardwood stumps, detonation is the best, and cheapest, done with cap and fuse; occasion but rarely arises where a blasting machine is required.

The charge is placed under the center of the stump, or the point of greatest resistance. The ability to calculate this, and the amount of charge, correctly, is obtained only by practice. It will readily be seen that correct location and amount of charge is the secret of economy.

It is best to use a bar made from a piece of steel shafting, about five and a half feet long, and weighing 23 pounds. One end of this bar is drawn to a point, and the other flattened like a chisel. Use the pointed end to punch the holes for the charge, and the chisel end to cut off small roots that sometimes interfere. When a stump is to be blasted, the calculation of the amount of the charge is greatly facilitated by "sounding" it; this is done by swinging the bar endwise and striking the stump with the chisel end. It can readily be seen that, unless the stump is a solid one, it can be shaken more or less with a bar of this weight.

In blasting on heavy clay, when it is wet, the bar sometimes sticks so that it can not be used to advantage. In this case, it is better to have a one and a half inch auger, with a four or five-foot shank, with which to bore the holes.

As a rule the proper dynamite for hardwood stumps is a medium slow powder of 40 per cent strength. In old stumps on clay soil the use of dynamite of twenty per cent strength is recommended; and on lighter soil and fairly green stumps sixty per cent is better.

The Revolving Shovel in Logging Road Construction, Washington

By Claude S. Martin, Clemons Logging Co., Montesano, Wash.

How an 18-B Bucyrus on Caterpillars Displaced a 30-ton Railroad-Type Shovel, Reducing Prices 50 to 30 Cents on Earth and 75 to 50 Cents on Loose Rock, Saving 15 to 20 per cent on the Job, Cutting Cost per Cubic Yard 10 Cents and Saving $6000 on One Job

This Article is Published through the Courtesy of the Timberman of Portland, Oregon.

IN making a revision of our main line this past summer to reduce grades and curves we were confronted with the handling of about sixty thousand cubic yards of material in addition to our normal construction for logging branches and spurs.

Opening bids for this work, which was a desirable piece of construction from the contractor's standpoint, being accessible at both ends and including considerable sidehill work, we found that we could not do much better than a price of 50 cents per cubic yard for earth, 75 cents for loose rock, and $1.00 for solid rock.

How the Caterpillar Shovel Saved 10 cents per Yard

The development of caterpillar traction however, has done away with many of these objections and we understand that one company at least was using such a shovel in our neighborhood. After visiting the operation of the Wynooche Timber Co., also at Montesano, and watching the work done by their shovel we were convinced that the use of such a machine would materially reduce construction costs for any company having enough work to keep such a machine busy. On taking our contractor to see this machine work we were able to reduce our prices on material in our proposed construction to 30 cents per cubic yard for earth, 50 cents for loose rock, and the same price of $1.10 for solid rock, a saving on the job of from 15 per cent to 20 per cent in construction costs, as the average cubic yard cost was reduced about 10 cents, or a saving of about $6,000 on the one job.

18-B Bucyrus owned by Clemens Logging Co. Overcasting on Logging Road Construction Montesano, Wash.

We had used a thirty-ton steam shovel on some of our other construction work with some degree of success but had found that the cost of a pit crew, and the slowness in moving, counted too heavily for the amount of yardage to be handled in most of our logging construction. Also, it was not practicable to move such a shovel far ahead of the steel. As there has been a scarcity of track labor for some time and most companies do not wish to have any more steel tied up than is absolutely necessary anyway, it was seldom possible to keep our track up to the construction.

We ordered, and got prompt delivery, on a Bucyrus 18-B shovel with caterpillar traction equipped with a seven-eighths yard dipper.

How the Machine was Moved

On setting the machine up we had to move about three hundred feet across a small creek, some soft

bottom land, and up on a sidehill to our grade-point, as the first job was to make a fill across this low place. It took about a day to make this move as we had to lay stringers across the creek; put puncheon across the soft bottom, and climb a twenty-eight per cent slope. The shovel made the hill under its own power by using a long strap, one end of which was thrown around a stump, and the other fastened to the dipper, which was run out to its greatest extent then run in as the shovel came ahead. This helped the traction of the shovel and also kept it from tipping. On lighter grades or when in a small hole the machine can help boost itself along by lowering the dipper to the ground close to, and just back of the caterpillars, and then extending the dipper arm.

Making the Fill

As we had a number of fills too long and high to throw up the material from the sides, we had to use small dump cars running on a 24-inch gauge track of 16-pound steel. As these cars dump either ahead or to the side, no temporary trestle work is needed to make any ordinary fill. The uphill haul for the cars is made with a horse.

For more extensive work, we would recommend a thirty-six inch gauge track, larger cars, and a small gasoline donkey or a dinky engine for power, as the main problem to be met in this sort of grading is to keep the shovel going to its capacity. By using a switch one string of cars can be loaded while the others are being dumped. At times the shovel is in a position where it can waste dirt while waiting for cars.

We boarded up our cars to a two-yard capacity, and with everything working smoothly on a two hundred-foot haul we have loaded and dumped ten cars in twelve minutes, without any extra speeding up.

Moving 285 Cubic Yards per Day

In four months work, being able to waste about twenty-five per cent of our dirt, we have averaged 7425 cubic yards per month or about 285 cubic yards each day at a contract cost of a little over 40 cents per yard, which allows the contractor a fair profit as we furnish the shovel, cars and steel.

This machine requires only an engineer, a fireman, and a pitman to run it. In addition we have had two men to drill rock and clear, and two men on dump to handle the horse and keep dump in shape.

We have gotton our water so far by gravity but are now installing a gasoline pump as we are getting above our gravity supply. It takes a fairly full stream from a one-inch pipe to keep the shovel going when working steadily.

Coal is hauled up by the horse once a day as a little less than a ton a day is needed on the average.

If necessary to move ahead along sidehills the shovel digs its own way with little loss of time. We have had no trouble as yet in moving ahead over new fills. In cuts where some of the material can be wasted it goes through first at an elevation that will allow it to throw the dirt over the sides, then runs back and takes out the bottom of the cut to make the fills, which allows the more solid material to go into the fills where it can do the most good, the lighter material being wasted.

The shovel will travel up to three-quarters of a mile per hour on reasonable going under its own power. It can be run on and off a flat car easily by using about four bridge stringers as a runway.

On sidehills where the material can be wasted and for fills up to eight feet high where the dirt can be thrown up from the side, five hundred cubic yards can be handled in a day of eight hours.

Economy Over Hand Labor

Even under conditions where the shovel has to wait for cars it is an economy. A good station gang of seven men will move from two thousand to three thousand cubic yards per month according to the show, and expect to make from $8 to $12 per day. This shovel with a crew of seven men has averaged over seven thousand cubic yards per month and will do better as we learn better how to use it.

Loading 2-yard cars for construction of a fill. Ten cars loaded and dumped in 12 minutes with a 200-foot haul.

Chunking

The chunking can be done by hand and by rolling out logs and chunks with dipper. Well shot stumps can be pulled by using a long strap or old line.

Scratch Work—900 Feet of Road per Day

These shovels are also being used on scratch work and have built as much as 500 feet of such road in a day under favorable conditions.

We expect to do most of our construction with this machine, and will adjust our equipment so we can handle a greater average yardage.

In building spurs we expect to get away from the use of cars as much as possible — to waste and borrow more. Also in rough country when moving back over the spur after the construction is completed, we will do the necessary grading for landings and donkey settings, as we can do this sort of work more cheaply than with a scraper.

We are well satisfied with the work so far and believe that these machines will be used extensively in logging road construction.

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THE
EXCAVATING ENGINEER PUBLISHING CO.

Bradlee Van Brunt, Manager and Editor
South Milwaukee, Wisconsin

It was two years and ten months ago that the last copy of the Excavating Engineer was read. Two years and ten months during which time much water has flowed over the old dam.

In May 1917 all the available man power of the Excavating Engineer stopped pushing pencils and mounted caissons. As announced at that time, it was deemed wiser to suspend publication outright, rather than attempt to struggle along with an entirely green crew at the helm.

Our subscribers and advertisers were notified of our enforced decision and given an opportunity to get their money back or to hang on and have faith until such a time as Fate and Victory would permit us to resume publication. The results brought forth a lot of pleasing things, but the most pleasing was a definite proof of how many sterling American friends were lined up behind the Excavating Engineer. The letters we received were enough to warm a heart of stone.

But, here we are again, we weren't "bumped off," and we are back on the job for good.

As we mentioned before, much water has flowed over the little old dam during these past thirty-four months. Peace, of a sort, is with us. We are no longer training armies to fight the Hun. But we find ouselves in a confusing chaos of strikes, murders, race riots, League of Nations arguments, prohibition and H. C. of L.

At times it is a very discouraging outlook for the average man to look upon. But this we do say, for we believe it. It is as natural a condition as the boiling wake of the sea after an ocean grey hound has plowed its way through. The sea will regain its placid surface, so will the world, after time has had a chance to heal the scars of the war.

We've heard a lot about commissions to investigate prices and commissions to beat up hoarders and other commissions to do other worthy things, but in our humble opinion, there are two things above all else that can help to turn the trick; the first of these is production and more production and the second, to spend less and save more.

Now about the dirt moving prospects. Never before in the history of the world has there been a better opportunity for a live contractor than in the road construction field. We all know it, so we are just sounding again a call that is being echoed from coast to coast. The man with the small shovel is the man who is going to garner the crops the forth-coming season. Irrigation and drainage work is coming fast too. Many new projects will undoubtedly open up from now on to delight the heart of the dragline man.

As for railroad construction, we've got to have it sooner or later. To some the situation looks gloomy but we are all familiar with the words of the poet:

"The darkest moment of the night
Is that before the morning light."

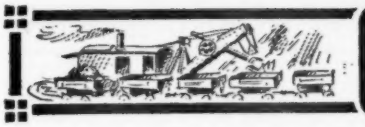
As the Railway Age very truly says, "The very fact that the railroads are today so far behind the needs of the country, makes or should make it clear that a period of activity and the expansion of railroad facilities lies immediately ahead. The commerce of the United States would have to stop growing if the expansion of railroad facilities were not revived on a large scale. But the commerce and industry of this country never have stopped growing, and they are not going to."

So all you old railroad constructors take heart, six months may yet see you scraping the rust off your outfits. The owners are again in control.

ADGER C. STANSILL

Adger C. Stansill, special representative of the Western Wheeled Scraper Co., died from the results of influenza on January 25th and was buried in his old home at Roanoke, Virginia, on January 28th.

Mr. Stansill was among the best known and most respected men in the contracting and railroad equipment field. His death is a shock to his host of friends. He had a heart as big as the whole outdoors, and his passing on has caused universal grief among those who had the fortune to call themselves his friends.



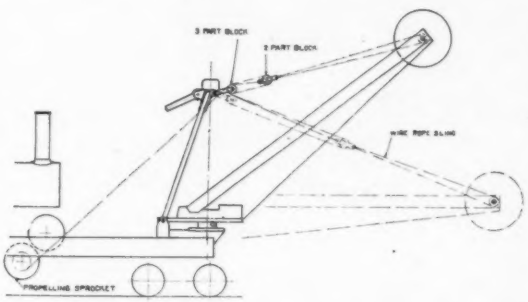
· FIELD NOTES ·

QUESTIONS pertaining to the operation, maintenance or repair of excavating machinery will be answered through this column. Address Field Note Department, Excavating Engineer, South Milwaukee, Wisconsin.

How to Raise a Boom on an Atlantic Type Shovel

Every Atlantic-type shovel is equipped with a three-sheave block and a two-sheave block, and a wire rope sling about 20 feet long which has a shackle on each end. The boom is usually loaded on a gondola or flat car.

The boom on an Atlantic type shovel is so placed on the flat car that the heel of the boom is generally from 6 to 8 feet from the end of the car. The first move, therefore, in raising the boom is to pull it back into the box of the base trunnion collar casting. To do this, run a block of wood through the spokes of the hoist drum gears and connect the sheave block mentioned above to a chain in order to pull the boom back into place as described.



Next hang the three-sheave block in the A-frame head front. Then take the 20-foot wire rope sling. Pass it around the hub of the big sheave, through the spokes of this sheave, around on the other side of the boom and back, dead-ending both ends to the two part block. This should be done in such a manner that the lead is off the top of one hub and off the bottom of the other, towards the back end of the shovel. Then connect up the sling as shown in the sketch and connect the two-sheave block to this sling as is also shown in the sketch, being sure to use the large pin in the sheave frame in this connection. Then reeve the ½-inch cable as follows: Pass over the center sheave of the three-part block which hangs over the A-frame head, over the two-part block which has just been connected to the sling, back over the three-part block, then over the two-part block, over the three-part block again and back to the dead end of the two-part block. The loose end of boom hoist cable is then led down to one of the two propelling sprockets. Take two turns around this sprocket and fasten the end of the cable to one of the spokes of the propelling gear. If in the process of hoisting this sprocket has been filled up with the cable, make the cable lead over into the second sprocket until the boom has been raised and the boom guys connected.

This method works out very well, for the reason that it is not necessary to disconnect the swinging cable from the swinging drum, as it is well known that on a reversible swinging engine, a clutch connects this engine either to the swinging drum or the propelling machinery.

How to Turn a Caterpillar Shovel or Dragline in its Own Length

It is no trick at all to turn a caterpillar mounted revolving shovel or small dragline in less than its own length. The following is a good method to employ.

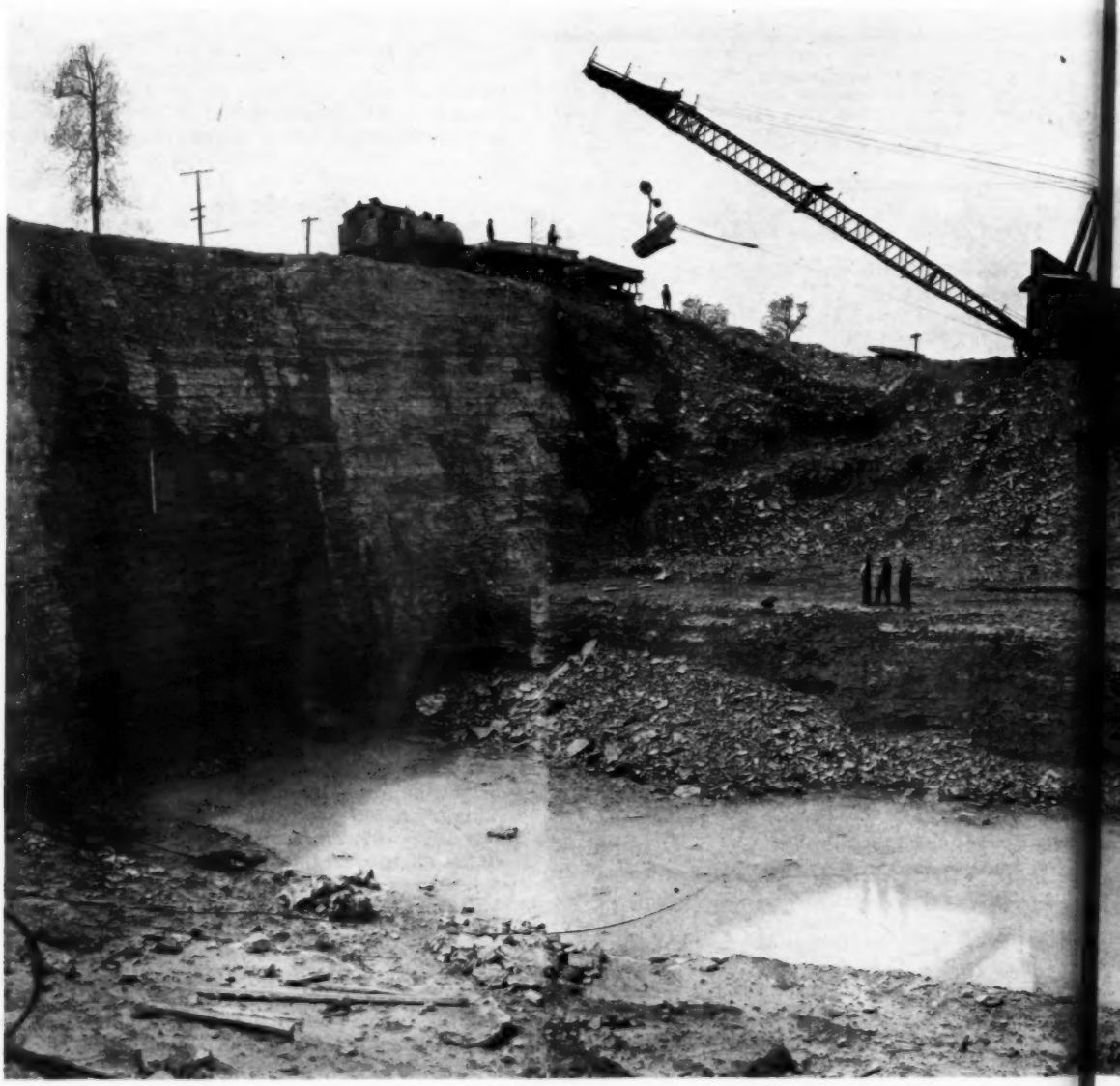
Unless on hard ground, throw plank under the off caterpillar. Take a block, preferably about 14 inches high and set it against the treads of the caterpillar on the rear corner. That is, if you were intending to turn to the left, set it diagonally against the left forward corner of the left caterpillar, which is not driving. The block should be at least 14 inches high, as stated, in order to set against a tread above the center of the tumbler.

As she turns, keep throwing plank under the off caterpillar. On good ground you can kick around as fast as you can throw planking, and on hard ground no planking is required, but where the bottom is soft or muddy, the material will pile up against the off side of the off caterpillar. One way to get around this is to drive ahead with both caterpillars far enough to clear and repeat the operation.

There is one precaution to be observed here. When turning the caterpillar on soft ground as above described, heavy stresses will come on the brackets and tumblers of the caterpillars because the links are plowing sideways through the ground. These stresses are likely to result in excessive twisting strains from the side reactions.

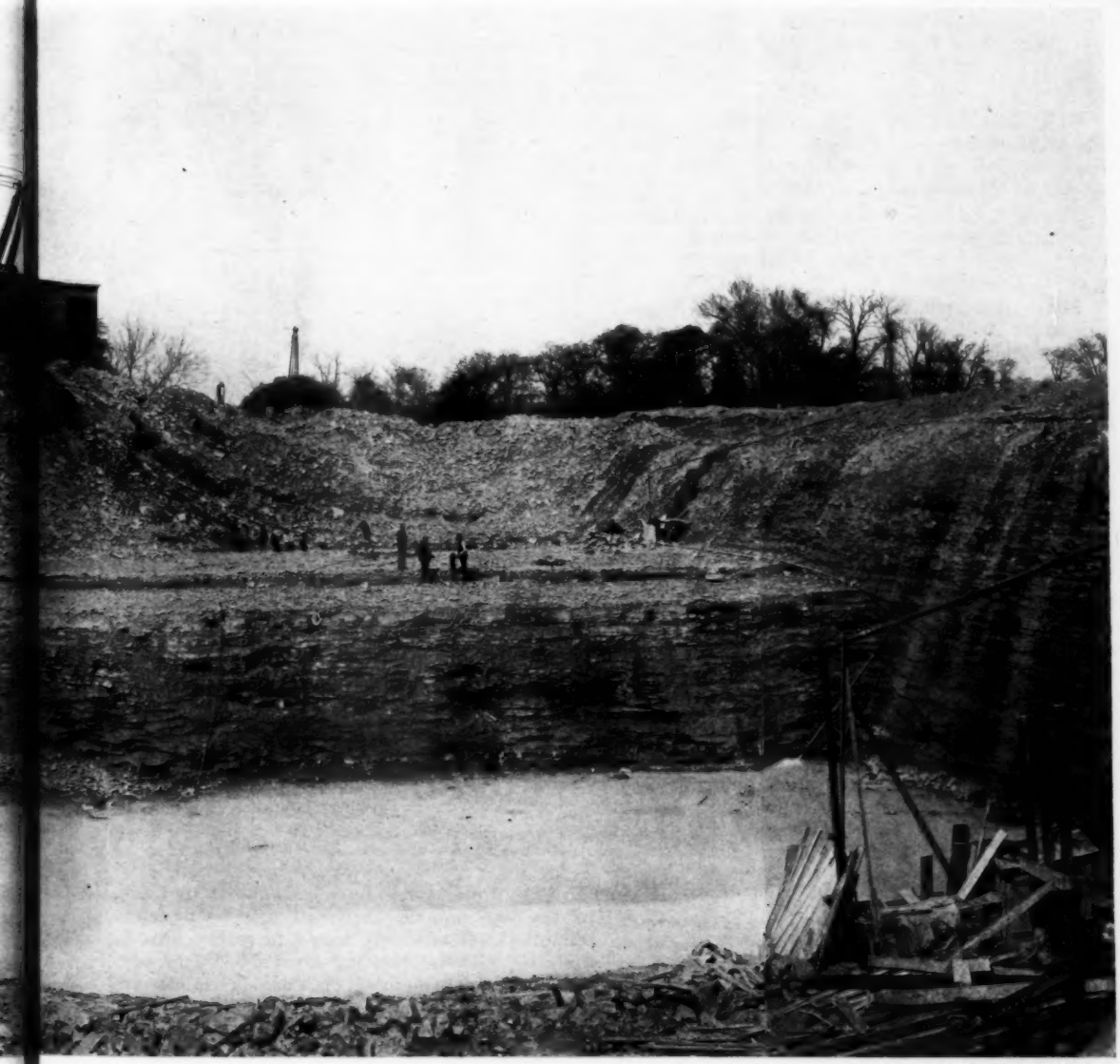
Consequently, it is preferable when turning on soft or muddy ground to turn as an automobile is turned in a cramped place, by a series of zig zag movements. In other words by turning on an arc of say fifteen degrees for a short distance. Then moving straight forward or backwards and repeating the operation.

If anyone has a better idea let's hear from him.



Bucyrus Class-24 electric dragline excavator at work on the Huffman Dam, Miami Conservancy District, near Dayton, Ohio. The dragline is shown excavating for outlet works below the conduits. The maximum width of the excavation is 220 feet and the maximum depth 65 feet. The Miami Conservancy Bulletin for June 1919, states as follows:

"All rock in this excavation seen in this picture was drilled and blasted and then removed



by the dragline excavator. This machine did remarkable work. At one setting it removed 25,000 cu. yds. of rock. It excavated the bottom of the pool (shown here) from approximately the same level as that on which it stands, a vertical distance of 60 feet."

Material was loaded into 12-yard dump cars. Ten Bucyrus dragline excavators of various sizes from the Class-7 to Class-175, six of which are operated by electricity, are being used on this project.

DEVICES YOU OUGHT · TO KNOW ABOUT ·

Wire Rope Tackle and a Handy Chart for Quick Computation

By W. F. Schaphorst

This chart is based on data published by the John A. Roebling's Sons Company of Trenton, N. J., who have given me permission to use their interesting and useful information on this subject.

Simply lay a straightedge across the chart once, as indicated by the dotted line, and column B immediately gives the pull necessary to lift any weight up to 200,000 pounds.

For example, what pull on the lead line is necessary to lift 20,000 pounds with five ropes leading to and from the moving block?

Connect the 5 (column A) with the 20,000 (column C) and the answer — about 4,700 pounds — is found at the intersection with column B.

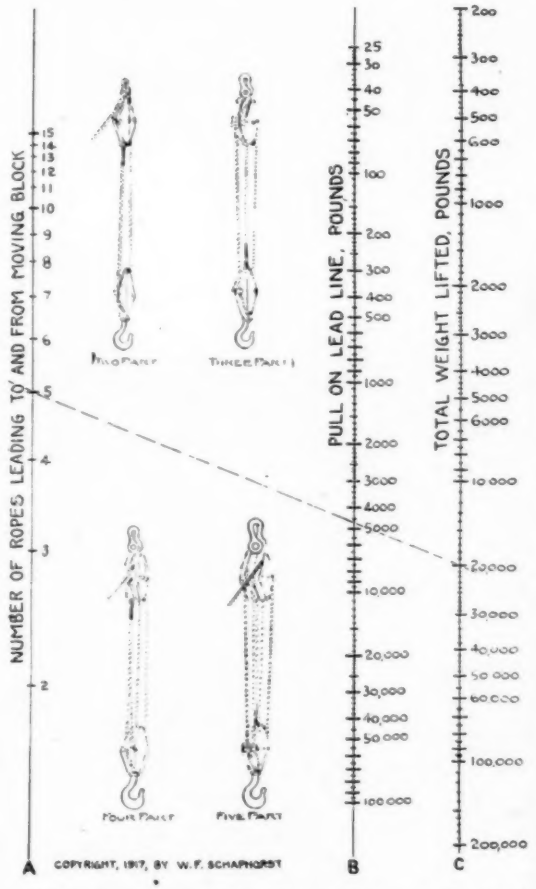
The beauty of this chart is that it takes into account the friction of the ropes and pulleys. The smaller the number of ropes the less the friction, but the greater the number of ropes the less the pull on the lead line. Quoting verbatim from the Roebling publication:

"In the field of construction and engineering, tackle using wire rope has largely supplanted those using manila rope. Such tackle ropes as used on derricks, hoists, etc., are reeved with a number of parts using single or multiple sheave blocks.

"The number of parts supporting the load is determined by counting the ropes leading to and from the moving block. To arrive at the stress on the lead line, common practice is to divide the weight of the load by the number of parts of rope supporting same; this, however, is not correct as it does not take into account the friction of the blocks nor the rigidity and internal friction of the rope.

"The maximum stress, when hoisting, occurs in the lead line, since this part besides taking the proportion of load on a single part, also takes the accumulated friction of blocks and rope in all the other parts of the tackle.

"To show the error arising in assuming all parts of rope in a tackle taking equal proportions of the load, we give an example of a seven-part hoist raising a load of 35,000 pounds. Usual practice for stress in lead line is $35{,}000 \div 7 = 5{,}000$ pounds, and assuming all parts pulling equally. This stress occurs, however, only in the bucket line. The correct method for maximum stress is 35,000 multiplied by 0.1807 which equals 6,325 pounds (this may be checked on my chart *W. F. S.*) where 0.1807 is the lead line pull factor for a seven-part tackle. This stress of 6,325 pounds occurs in the lead line only and is 27.5 per cent greater than the value found by the first, incorrect method.



"If a rope were to have been chosen on the basis of the 5000 pounds stress with a factor of safety of 6, this factor of safety would in reality have been only 4¾ with the resulting stress of 6,325 pounds. In many cases contractors do not use such a large factor as 6 to start with, and hence the actual factor is reduced in proportion and short rope life results frequently causing dangerous and costly accidents."

The ropes usually used in construction work are 6 x 19 construction and Blue Center steel quality, though plow steel can be used if the stress is within the limits of this quality. The ropes range from one-half inch to seven-eighth inch diameter inclusive, with the ropes included in the above requirements and with the tread diameters of the sheaves in the blocks not less than twenty times the rope diameter" ****this chart is applicable.

SHOTS FROM THE · FIRING LINE ·

Alaska

The 470 miles of the Government railroad construction in Alaska is now more than two-thirds completed, and the work is progressing satisfactorily. The cost of the construction averaged about $75,000 a mile. The most expensive stretch was thirty miles along Turnagain Arm, where it was necessary to blast solid rock most of the way. This cost as high as $200,000 a mile. The primary purpose of the road was to get at the Matanuska coal fields, which will supply most of the coal for Alaska. These fields are now open to tide water and more than fifty-five thousand tons of coal was mined here during the year ending June 30, 1919.

Arizona

The following men are operating six Bucyrus 88-Cs for the Phelps Dodge Corporation at the Copper Queen Mine, Sacramento Hill, Bisbee. These shovels are all stripping and are digging material which runs very high in rock. They are working two shifts day and night.

Operators	*Cranesmen*
John Kernan	J. Miller
James Ryan	S. Moore
Ted Krantz	J. Moore
Lee Oliver	D. Eadden
John Conley	D. Woolf
Dick Switzer	F. Smith
James Kelley	R. Smith
John McDonald	B. Lindquist
C. Toleen	H. Lyons
Thomas Kane	F. Spence

Arkansas

McWilliams Co. of Chicago have been awarded a contract for constructing a drainage system to reclaim 30,000 acres of farm land in Lafayette County, for $260,000.

California

Tranquility Irrigation Dist. has let a contract to J. E. Johnson, Tracy, for (a.) 133,000 cubic yards of earthwork reconstructing ditches in Sect. 1, at $.27 per cubic yard, (b.) 120,000 cubic yards excavating and embankment for new canals in Sect. 2, $.38 per cubic yard., and (c.) 30,000 cubic yards of excavation in Fresno slough, $.55 per cubic yard, total cost $98,010.

The Board of Freeholders Los Angeles Co., Los Angeles, has received bids excavating 4 miles flood channel for Ballona Creek, 150 ft. wide, 4-5 ft. deep, near here in 3 sections, involving (1) 50,000, (2) 90,000, (3) 30,000 cubic yards of earthwork respectively; dragline, scraper and shovel work, from Ross Construction Co., Point Loma, $0.374 per cubic yard for all, total $65,670; United Dredging Co., Central Bldg., Los Angeles, $0.494, $83,980; and P. L. Burr, 512 Mission St., San Francisco, (1) $0.59, (2) $0.645, total $87,550.

Cordura Irrigation Dist. has let contract building six miles of main irrigation canal, involving 35,000 cubic yards of excavation, 10,000 cubic yards of embankment and eight drainage structures, to J. A. Huntington, Oroville, for $23,744.

Canada

Montreal and Vicinity

BY B. ST. JOHN

Canadian National Railways are figuring on doing a lot of improvement work this coming summer and are very busy getting their equipment ready.

Mr. W. H. Secord has been appointed Supt. of Steam Shovels on all lines of Canadian National Railroads, North of the St. Lawrence River, with headquarters at Toronto, and Mr. Carroll has been appointed to the same position on all lines South of the St. Lawrence, with headquarters at Moncton, N. B.

L. A. Ott and Company have equipped one of their 14-B Bucyrus shovels with a long boom and will use it on sewer excavation on a contract they have for the Town of Hampstead, amounting to about $500,000.

Indications point to the resumption of work on the new Welland Ship Canal this spring. If contracts are let for those sections on which work has not been started there will be some of the finest work ever let in Canada.

The Hydro Electric Power Commission of Ontario are working all of their ten Bucyrus shovels and are rushing the work to completion with all possible speed.

There will undoubtedly be a lot of Public Highway work done in Canada during the Summer of 1920, if equipment can be secured from the United States. The exchange situation as it stands today, adds about 15 per cent to the cost on such equipment, and naturally, contractors are holding off to the last minute before placing orders, in the hopes that the exchange will drop, although they may have to wait several months for deliveries, which will mean that they will not get a full season's work.

Winnipeg and Vicinity

BY DOMINION EQUIPMENT AND SUPPLY CO., LTD.

The Greater Winnipeg Water District, who installed the system supplying Winnipeg with the excellent water from Shoal Lake, contemplate an expenditure of $150,000 for this season's work. They are inaugurating a commercial gravel business as well as granite building block quarries, and there is a very promising outlook for success in both ventures. The Greater Winnipeg Water District are using a Bucyrus Dragline Excavator.

Construction work in Winnipeg and vicinity is not yet under way as King Frost still holds us in his icy grip, but construction men from far and near are here attending the most successful Bonspiel ever held in the city's history.

Vancouver Notes

A. R. Clucas, formerly assistant city engineer of Vancouver, B. C., has been appointed town planning engineer for Birmingham, Eng.

A. E. Foreman, public works engineer for the British Columbia government, gave an address on "Organization and Work of the Public Works Department" at the annual meeting of the Victoria branch of the Engineering Institute of Canada. He stated that the province has been divided into eight districts, with a qualified engineer in charge of each district, and that good results are forthcoming.

G. A. Henderson, president of the White Valley Irrigation and Power Co., has been notified by the Provincial Department of Lands that a further loan of $70,000 has been granted this company to effect necessary repairs and improvements in the system.

Contract has been let to George Churchill and Son, of Vancouver, for erection of an 18-room addition to the Powell River hotel, owned by the Powell River Co. Estimated cost $12,000.

The Canadian Carbonate Company, Montreal, will build a $100,000 plant in Kitsilano, contract for which has been let. Local manager, W. Kelsey Hall.

A contract has been let to Sidney E. Junkins, an eastern Canadian contractor, for lining with concrete the Connaught tunnel, the five-mile bore of the Canadian Pacific through the Selkirks. The work will constitute one of the greatest concreting jobs on record. The plant which will supply the power for the concreting will cost several hundred thousand dollars.

Order-in-Council has been passed at Ottawa providing for expropriation of Skinner Cove property as a site for erection of a drydock at Victoria. Tenders will be called shortly.

It is stated that 50,000 acres in Southern Alberta will be placed under irrigation next spring and thrown open for farm settlement by the Canadian Land and Irrigation Company.

The construction of a motor road to Jasper Park and thence to the coast may be proceeded with, according to a statement made by Premier Stewart, of Alberta. Approximate cost, $300,000.

Three large irrigation districts adjacent to McLeod, Alta., and embracing a total area of 230,000 acres are now in process of organization.

Work has started on the foundations of a large bridge to be erected between Williams Lake and Deep Creek by the P. G. E. Railway.

George B. Armstrong, engineer of Los Angeles, Cal., has been engaged by the provincial government to give advice on the

UMI

Lethbridge northern irrigation project, construction on which, it is expected, will be started this Spring.

A deputation requested the provincial government at Victoria to build a road out of Prince Rupert and erect a bridge over Skeena River at Terrance.

A movement is on foot to build two and one-half miles of new road to connect Duncan with Genoa Bay.

The C. P. R. is surveying a line to Campbell River, a distance of 40 miles from Comox.

British Columbia Electric Railway plans to double track Hastings St. East and make other improvements.

Construction program of Pacific Great Eastern Railway for this year included forty-one timber bridges, three steel bridges, twenty miles of new line and regrading of 330 miles.

It is estimated that it would cost $2,000,000 to drive a tunnel under the Inner Harbor and link up the ocean docks with the Canadian National Railway terminals at Victoria.

Colonization plans of the B. C. legislature contemplate expenditure of $5,000,000. Of this amount $1,250,000 will be expended on completing the Sumas scheme, another large amount for the Southern Okanagan scheme, and plans for the Peace River block will consume a large share of the remainder.

Delaware

Sussex Co. has let contract for building 2.30 miles road from Blades to Concord, to T. S. Holt, Federalsburg, Md., cost $79,958; 4.65 miles road from Roxana to Millville, Contr. C. S. 11, involving 20,000 cubic yards of earth excavating and 39,000 square yards bituminous macadam, and 4.58 miles road from Georgetown to Harbeson, to Empire Construction Co., Empire Bldg., Philadelphia, $124,838 and $113,070, respectively; all 14 feet wide.

Florida

The Miami & Tampa Ry. Co. has graded fifteen miles alongside of the Miami Canal, and expects to have 25 miles ready for operation by next fall. N. W. Parlee is engineer. Wm. C. Wolfe of Miami is president.

Illinois

Tritt Bros. of Belleville have been awarded a contract for the grading of the Fayetteville St. Libory Road for $22,005.

Indiana

J. C. O'Connor & Son of Fort Wayne have been awarded contract for constructing the Vernon Road for $39,218. Work on the road will extend from the City limits to Grand County line, a distance of 10.6 miles.

Kansas

The Commissioners of Jefferson Co. have let contract to Yole & Raegan, Chicago, involving 25,850 cubic yards of earth embankment at $0.26 per cubic yard and 506,855 cubic yards earth excavation, $0.23½, total cost $150,000.

Pittsburg and Vicinity

BY A. M. NIELSEN

Many changes have taken place in this district since the last issue of the Excavating Engineer was published. Several of the Shovels have changed homes for better or worse, Smith, Scott and White have ceased operation in this field and sold their machines, three 175B Bucyrus shovels, to the Litchfield Coal Co. Two of these machines have been erected and put to work while the third one is waiting for nice weather.

Canal Fuel Co. sold their 175B Bucyrus to the Saragosa Mining Co., Birmingham, Alabama. The shovel is being dismantled now for shipping under the supervision of Mr. J. J. O'Rourke.

The Pittsburg Chamber of Commerce is working very hard to have this city an up-to-date town. Not only are they trying to make the city very modern but also trying to beautify same as much as possible. Contracts have been let for a great deal of sewer digging and the Independent Construction Company has procured all of it. At present they are digging a sewer on the south side with their new 14B Bucyrus, and C. C. Miller, shovel runner, is feeling as proud as a peacock since he took the 14B up a thirty-two per cent grade after having completed digging the basement for the Long Bell Lumber Co. Even the city engineer of Pittsburg here was surprised when the shovel made its phenomenal climb, and measured the grade. Conditions are pretty well settled again and coal is selling for $4.00 for Nut and Lump, although Government prices are somewhat lower, $2.80 for Slack, $2.95 for Mill, $3.05 for Mine Run and $3.30 for Nut and Lump.

All mines will be operated again after the 16th of February under ownership control.

Louisiana

T. S. Womack of Tangipahoa Parish was low bidder for constructing 4.91 miles of the New Orleans-Hammond Highway at $59,582.

Michigan

Contracts have been awarded as follows: Manistee Co. Commission, Manistee, for 2.213 miles of Road No. 11-2. Manistee County, at $18,028; Irwin Butzer of Hart County for 4.472 miles Road No. 39-3, Ionia, for $28,721; A. D. Cleveland, Casnovia, for Road No. 54-11, Kent County, at $3,200.

U. S. Engr. Office, Federal Bldg., Detroit, has let contract for dredging and rock excavating in Livingstone Channel, Detroit River, involving 98,000 cubic yards limestone rock and 345,000 cubic yards place measurment of earth, to Empire Eng. Co., Inc., 6 Church St., New York City, $600,760.

Minnesota

John Snowberry, a steam shovel and dragline engineer, is at the present time craning and acting as engineer for the M. A. Hanna Ore Company at Harold Mine, Hibbing. He is at present craning a 103-C Bucyrus for this Company.

Missouri

The Kansas City & Leeds Electric Ry. Co. has applied to the Missouri public service commission for authority to build an electric railway from the intersection of 31st street and the Raytown road to Leeds, Mo., about 10 miles. W. E. Winner is interested.

Nebraska

Callahan & Walker Construction Co., of Omaha have been awarded contract for excavation involving 207,000 cubic yards and construction of a ditch four miles long at 17½ cents a cubic yard.

Nevada

Our old friend J. H. Bitner states that they are having fine weather in Ruth. He is operating a shovel for the Nevada Consolidated Copper Co. He advised us a short time ago that they had a bad wreck in the pit when a train, comprised of an engine and eight 28-yard cars ran away, killing the switchman and smashed the cars. The engine was not damaged.

New Jersey

The Utility Construction Company of New Brunswick was low bidder for constructing section 4 of route 13, between Kingston and Princeton for $104,234.

New York

In his annual report which was submitted to the New York Legislature on Feb. 16th, State Engineer Frank M. Williams made some interesting conclusions and proposals in regard to various subjects that will be of interest to contractors.

He condemns the St. Lawrence Ship Canal Project and pleads that the barge canal be given a fair trial. The former project, it will be remembered, was a proposal for the United States to give financial aid in the construction of a water way for ocean going vessels to the Great Lakes. This would call for the improvement of St. Lawrence River between Montreal and Lake Ontario. The bitter opposition which arose to this proposal in this country from the advocates of an ex-American route lead to the authorization of a survey for a ship canal between the Great Lakes and the Hudson River.

Mr. Williams recalls the fact that the proposal for an all-American route was made by the United States Deep Water Ways Commission, which in 1897-1900 made exhaustive surveys and favored the most feasible route, which was known as the Oswego, Oneida Lake, Mohawk River route, to be used in conjunction with the construction of a canal between Lakes Erie and Ontario. When the barge canal was proposed, this type of canal was selected after thorough study of the feasibility of both projects. The ship canal was found to be far too expensive and consequently the barge canal was adopted. No new factors have entered into the problem since that time.

For that reason, Mr. Williams pleads that the barge canal be given a fair trial. The canal, except for some small construction work, is completed and has been in full operation since 1918. There has been a lack of sufficient traffic on the canal for which he ascribes several reasons, among them being Government control, lack of boats due to the war and high prices, and principally the need of knowledge concerning the advantages of the canal on the part of the shippers in the country fed by the canal. He states furthermore that proper connections have not been made by the Government to the canal system. This is principally at Oswego, where harbor improvement is necessary, the deepening of the channel north of the city of Hudson on the Hudson River, which would allow canal barges to trans-ship their cargoes at Albany into ocean-going vessels, the construction of grain elevators at New York, Buffalo and Oswego and the improvement of terminals at Poughkeepsie, Kingston, Newburgh and Yonkers.

John Flynn of Waterford has been awarded a contract for constructing part 3 of the Chertown-Hague Road, 5.13 miles, for $109,659.

Felton Construction Company of Buffalo has been awarded a contract for constructing the Alden-Cowlesville Road, 3.77 miles, at $123,000.

North Carolina

The Powell Construction Co. of Columbia, S. C., L. S. Davis & Sons, Albemarle, N. C., Virginia Construction Co., Petersburg, Va. and W. E. Graham of Mt. Ulla, N. C., have just been awarded highway work in this state. This work will be done with drag and wheeled scrapers.

Union Co. has let contract graveling twenty-five mile Jackson Highway, to Porter & Boyd, Charlotte; about $300,000; cost plus percentage basis.

Northern States News

Bids for one of the largest new highway projects, from the standpoint of cubic yards of grading, were received by the Board of County Commissioners of Hennepin County, Minneapolis, Minnesota, on February 16th. This work, known as Contract No. 2, calls for grading and graveling approaches to Lyndale Avenue Bridge over the Minnesota River. Approximately 500,000 cubic yards of earth work on twelve miles of mostly new location. A. Guthrie & Company, St. Paul, Minnesota, were the successful bidders. Other bidders on this work were Foley Brothers, St. Paul, Minnesota, J. J. & M. S. Mergens, Minneapolis, Minnesota, Nelson & Frederick, Minneapolis, Minnesota, and Winston Brothers Co., Minneapolis, Minnesota.

S. J. Groves & Sons announce the removal of their offices from the Kasota Building, Minneapolis, to the Globe Building.

Adams & Eret, St. Paul, Minnesota, were awarded graveling contract of Federal Aid Project No. 36, bids for which were received at Blue Earth, Minnesota, on February 13th. The other work on this project was not awarded.

Northern Minnesota Drainage Company, Litchfield, Minnesota, have been awarded contract for the construction of County Ditch No. 68 in Otter Tail County. This work comprises approximately 243,000 yards.

McCree, Moos & Company, St. Paul, Minnesota, were successful bidders on the concrete paving contract of State Road No. 1, Federal Aid Project No. 114, bids for which were open at Elk River, Minnesota, on February 13th. L. W. Carter, Zimmerman, Minnesota, was the successful bidder on the grading work of this section.

Mark J. Woodhull has been wintering at Hibbing, Minnesota, during the past few months. In addition to meeting many of the mining officials on the Mesaba Range, Mark advises that he became personally acquainted with all of the Greek restaurant proprietors in that vicinity and knows their daily menus by heart. On his next visit to the iron range he will carry a kitchenette with him.

Mr. R. F. Whale, Secretary and Treasurer of the Waupaca Sand & Gravel Company, is extremely busy these days getting their new machinery installed at their new sand and gravel pit near Appleton, Wisconsin.

John Wunder, Pres. of the Blue Limestone Company and Mgr. of the Trap-Rock Company, reports the installation of considerable new machinery at their Minneapolis gravel plant and their Dresseler Junction quarry, respectively. They have a great many orders on their books for the coming season. They anticipate the largest business of any season at both plants, and are making preparations to take care of this business adequately and promptly.

Northwestern News

BY L. T. RUSSELL, PORTLAND

Boss & Hampshire are getting on well with their highway work near Ellensburg. They are using two 18B Bucyrus shovels and expect a good estimate during February.

Daniel Kern is busy getting out rock at his St. Helens quarry for Highway paving, and has more work than he can do in this line.

A. D. Kern has nearly completed his grading contracts on the Columbia highway, but has considerable paving yet to do.

Mr. William Smail, chief engineer of the Northern Construction Company, was a recent caller at Bucyrus Company, Portland office. Come again Mr. Smail.

The Puget Sound Bridge & Dredging Company have considerable work under way near Astoria, Oregon, as well as other coast points.

Everyone in the construction field is expecting a busy season, in many cases finishing work started last year, also lots of new work is expected as soon as spring weather is with us again.

Warren Construction Co. is pushing dike work for Multnomah Diking District No. 1 just East of Portland. Team work has made good progress during recent good weather and E. J. Cheatham & Sons are making good showing with a Bucyrus Class 14 dragline.

W. G. Brown, Yeon Bldg., Portland, is District Engineer.

Contract for 15 miles of road between Blue River and Belknap Springs, Oregon, has been awarded to Sims & Carlson, Spokane, Wash., at $97,000.

Baker Brothers of Portland have completed a 330,000 yard contract for road construction by Multnoma County including some heavy cuts. They used a Model 60 Marion and a Bagley grader on this work.

Ohio

BY E. G. LEWIS, CLEVELAND

Great progress has been made during the past year toward the working out of a comprehensive plan for the City of Cleveland which when completed will make provision for the following:

An adequate street system which will care for present and future traffic to include street widenings and extensions,

For the zoning of buildings for local and rapid transit facilities.

For improved local and rapid transit facilities to include additional car lines, etc.

For lake front and river improvement.

For grouping of public buildings.

For additional parks and playgrounds.

For a new Union Station the cost of which will run well into the millions,

For the establishment of a conserving district effecting the Cuyahoga river straightening through the City.

Much of the above contemplated work will be started during the present year.

Cincinnati like Cleveland has ambitious projects and is successfully carrying out its plans by starting work on its new subways and terminals. Parks, canals and street improvements are included in the extensive program.

Contracts for part of the Subway system have already been awarded to Hickey Bros. of Columbus and D. P. Foley of Cincinnati.

With the great volume of State, County and City road and street improvements contemplated and now in operation the demand for mineral aggregate, cement and brick is so great that all the producers are now well booked up for their season's output.

The Cleveland Builders Supply and Brick Co. of Cleveland have some twelve brick plants in operation in and around Cleveland and to supply this unusual demand they report the double

shifting of most of their plants in order to supply the demand.

The Kelly Island Lime and Transportation Co. also report the usual activity.

The Cleveland Builders Supply and Brick Co. have recently installed at their terminal plant a Bucyrus 18-B caterpillar shovel which is the first installation of the new fleet of this type of shovels which are being installed as rapidly as deliveries can be made.

Mr. Reader, President of the Bedford Ohio Silica Sand Co., reports that the season's demand for sand promises to keep their new Bucyrus 14-B caterpillar shovel operating double shifts throughout the summer.

C. R. Cummins Co. of Cleveland are preparing to commence work on their Detroit Sewer contract at an early date.

The Nichols Company of Chicago will commence operation April on the Lima, Ohio, sewer job about April first. They are using on this work a Bucyrus class 72 Trench Excavator.

The reports from the Coal stripping operations in southwestern Ohio are to the effect that orders are plentiful but that shipments are retarded because of car shortage.

The Union Coal Stripping Co. at Lafferty, Ohio, have just placed in commission their new 225-B Bucyrus shovel.

The Wayne Coal Co. report the following stripping progress from the Folks Station Ohio work, for the month of January:

Shovel No. 1, 41,551 cubic yards in 191.5 hours, average 2169 cubic yards in ten hours.

Shovel No. 8, 131,984 cubic yards in 428.5 hours, average 3080 yards in ten hours.

Shovel No. 9, 76,776 cubic yards in 333.6 hours, average 2302 yards in ten hours.

The month of January was an exceptionally severe month as the weather conditions were the worst known in that section for years. The records reported were all made by Bucyrus Shovels of the 225-B type.

The smile that would make "Mill Buldoon" green with envy appears today upon the face of the highway contractor who has the contract for a good piece of highway work duly executed and tucked away in his inside pocket and is assured an early delivery on his caterpillar shovel, has his organization perfected and is now only waiting for the robins to indicate that 'Spring has came' and with it the desire to get busy.

Oklahoma

Bids were opened at Bristow, Okla., January 30 for the Oklahoma Southwestern Railway, to be 50 miles long from Bristow to Okmulgee, Okla., including one bridge of 100-foot steel span and a total of about one mile of ordinary pile bridging. The country is rough to rolling. J. L. Allhands of Rogers, Ark., is the contractor. Work begins immediately, to be pushed to a finish. W. Matthews is chief engineer.

Pennsylvania

Pittsburgh and Vicinity

BY F. A. RUMBARGER

There will be a large letting of State Roads by the State Highway Commissioners at Harrisburg, March 2nd and 3rd.

The Clinton Block Coal Company Stripping Operation near Imperial, Pa. is in charge of Superintendent Wm. Schmidt. The 225-B Bucyrus is operated by Ed Smith, Engineer, Charlie Horne, Cranesman, Clarence Moore, Fireman, and Albert Saurers, Oiler. John Kask is running the 35-B Bucyrus coal loader. This Company is loading all the coal that they can get the railroad cars for.

The Blanchard Coal Company who have a stripping operation near Wyano, Pa. are just moving their 225-B Bucyrus on the coal and expect to be running coal within the next few days. The coal will be mined by a special 35-B Bucyrus. The coal will be hauled from the pit in Western five-yard side dump cars. The work is under the able management of Supt. Walter Hopple. The 225-B Bucyrus will be operated by D. E. Gilmore, Engineer, Roy J. Cash, Cranesman, and M. J. Quinn, Fireman. The 35-B Bucyrus is operated by G. W. Baker, Engineer and James Quinn is firing. Messrs. Williams and Rainier have been here for the last month erecting both shovels.

The R. H. Cunningham and Sons stripping operation at Monroeville is operating a Bucyrus Class-24 Dragline which is working three shifts. The engineers running the Dragline are C. C. Galyen, Lee Heisler and Philip Heisler. They are using a 70-C to mine the coal after stripping it and Bill Martin is the Engineer in charge of the 70-C. This same Company has State Road Work on the Export Road near Harrison City and this work is progressing as well as the weather will permit. They are using a 14-B caterpillar shovel which is operated by Jack Titus.

The Kampel Wickersham Company will have a small stripping operation near Harrison City, Pa. and will use a Bucyrus 35-B caterpillar shovel to strip the coal and a Bucyrus 18-B caterpillar to mine the coal. The 35-B is just being erected and the 18-B has been erected and has been operated by Engineer Parker.

It is reported that the Industrial Coal Company has sold their stripping operation to a large Steel Corporation in Youngstown. The Industrial Coal Company has been operating a Marion 300 and a Marion 36. The operation is located in Bellwood County, Ohio.

Southern News

Birmingham and Vicinity

BY C. N. BALLENTINE

Hackett-Garsaud, Inc., is the name of a new company with headquarters in the Whitney Central Bank Bldg., New Orleans, La., which has been formed to handle large drainage and levee projects. Messrs. Hackett and Garsaud were officers in the engineer corps and saw service on the other side. They have had considerable experience in contracting work, and should make a fine success in the new undertaking. At the present time they have a large drainage contract with the Lake St. Peter Drainage District, La., on which they are using a Bucyrus Class-24 Dragline.

Tennessee Agricultural Chemical Corporation, Centreville, Tennessee, have a large stripping project in view at their mine near Centreville. This work contains several million yards. Any contractors interested should communicate with Mr. D. S. Miller, General Manager, Centreville, Tenn.

Roach, Stansell, Lowrance Bros. & Company, Memphis, Tenn., are installing a new Bucyrus Class-24 Dragline at Waterproof, Louisiana, which will be used on the large levee contract that this company has with the Fourth District, Mississippi River Commission.

The office of Mr. H. M. Feild, Whitney Central Bldg., New Orleans, La., will be moved the latter part of this month to Preston, Cuba, and in the future all business will be handled through the new office.

Erector Shafer passed through Birmingham, Monday, on his way to Dunnellon, Florida, where he will erect the two 35-B revolving shovels purchased by C. & J. Camp of Ocala, Florida. These shovels will be used in the mining of rock phosphate.

Erector George Stanberry is installing a Class-9½ electric dragline for the Bibb Brick Company at Macon, Ga.

The American Bauxite Company at Bauxite, Ark., recently let a contract for stripping two million yards of overburden to the Sanders-Ward Construction Company of Little Rock, Ark. This contract calls for the removing of this amount of overburden within two years. The mines of the American Bauxite Company in Saline County, Ark., are considered to contain the world's largest bauxite deposits. The American Bauxite Company own and operate seven Bucyrus small revolving shovels, which they use for loading ore. The ore depths are from six to twenty-five feet thick. This company is subsidiary of the Aluminum Company of America. A large percentage of the aluminum ore used by this company is mined by the American Bauxite Company.

That Arkansas expects to have a fine system of roads is indicated by the large number of road contracts awarded during the year of 1919; but progress on the work has been handicapped during the past few months due to the large amount of rainfall. The contractors are hoping to have better weather soon, in order that the work can go ahead.

The McWilliams Dredging Company of Chicago and Memphis were recently awarded a drainage contract at Lewisburg, Ark.

Contract for 43 miles of road has been awarded by the Tennessee State Highway Dept. to the Southern Construction Company, Harriman, at about $1,000,000.

A. J. Wright of Cleburne, Tex., proposes the construction of an interurban railway from Cleburne to Glen Rose, Tex., about twenty-five miles.

Hicks and Smith of San Angelo has been awarded contract for constructing 11.75 miles from Hillsboro, Tex., south to the McLennon County line for $115,322; McElreath & Rogers, Corsicana, has been awarded contract for seven miles on the Cleburne Road from Hillsboro, north, for $52,905.

The Elkin & Allegheny R. R. Co. has been chartered with $1,000,000 authorized capital stock to take over, operate and extend, the Elkin & Allegheny R. R., which has been in the hands of receivers. This line, projected from Elkin to Sparta, N. C., about forty miles, has been completed and is in operation between Elkin and Veneer, 16 miles. Beyond the latter point it is said that about twenty miles of grading have been done, and the new company intends to continue construction not only to Sparta, but to Jefferson. N. C., a total distance of about seventy-five miles. Those interested in the plan are H. C. Chatham and C. B. Peny of Winston-Salem, N. C.; J. Clinton Smooth of North Wilkesboro, N. C.; R. A. Doughton of Sparta, J. F. Hendren and G. T. Roth and others of Elkin, N. C.

South Dakota

C. H. Cammack is operating a 14-B Bucyrus on caterpillars for the W. R. Shipman Construction Co. at Sioux Falls.

Utah

Salt Lake City

We are pleased to publish below a photograph of E. D. Harris, first class shovel engineer, name-stamped-on-the-bottle, all-wool and a-yard-wide type. Mr. Harris has been pulling levers for twenty-five years and has operated nearly every make and size of anything that digs. His list includes 75, 70, 65, and 55 ton, 70-C and 14-B Bucyrus shovels, Models 91, 60, 20 and 36 Marions, a Model G Barnhart-Marion, Thews, Atlantics, American Ditchers, clam shell machines and various types of locomotive cranes. There are not many in the business today who can beat this record. In December he was doing splendid work with a 14-B Bucyrus on the Carbon County job, described in this issue and at present he is running a 70-C slamming through rock cuts for the Christensen Construction Co. on their contract with the D. & R. G. Railroad near Alberta at the southern end of Utah Lake in Utah County.

E. D. Harris

Virginia

Richmond and Vicinity

BY J. S. SKELTON

C. S. Luck & Sons of Richmond, Va. have just purchased a new Bucyrus 14-B Caterpillar Traction Shovel, for use on State Highway work in Virginia.

Broad River Lumber Company, of Stackhouse, N. C. (Madison Co.) has just purchased a Bucyrus 14-B Caterpillar Traction Shovel for use in connection with building a Logging Road several miles long.

North Carolina State Highway Commission has recently awarded road work to the Powell Construction Company, of Columbia, S. C.; L. S. Davis & Sons of Albemarle, N. C.; Virginia Construction Co., of Petersburg, Va. and W. E. Graham of Mt. Ulla, N. C. There will be quite an amount of additional road work let in the near future.

The Hassenger Lumber Co., which operates a large lumber plant at Kannorock, Washington County, Va., has acquired a large tract of fine timber land in Ash County, N. C. and will soon build a lumber railroad from Kannorock into Ash County, so as to better develop the property purchased. It is understood that the plan is to haul the rough timber from the Carolina Forest and work it at the Mills and Woodworking establishments of the Company at Kannorock.

The work of repairing the Iron Furnace of the Intermont Coal and Iron Corp., at Big Stone Gap, Va., has been completed; the filling in has been well done, and the furnace which has been idle for a long period of time now goes into full blast. This furnace, which makes a high grade of Pig Iron, has been made up to date and modern in every particular, and its capacity greatly increased.

Major Roswell D. Trimble has announced his resignation from Winston & Co. of Richmond, Va. and New York, and has formed the firm of R. D. Trimble & Co. who offer their services as Consulting & Constructing Engineers, with considerable experience in estimates and plans, and also in the handling, development and construction of ruling, highway, water supply, drainage and industrial projects. Their address is Allison Bldg., Richmond.

U. S. Engineer Office, War Dept., Wash., D. C., has let contract for dredging in Pagan River, Norfolk, to W. H. French Dredging & Wrecking Co., Arcade Bldg., $6,806.

Washington

E. J. Cheatham & Sons are operating a Class-14 Bucyrus dragline excavator on a diking job on the outskirts of Portland, where they have a sub-contract. Their address is, care of W. J. Brown, Yeon Bldg., Portland.

Grant-Smith Co. of Seattle has been awarded contract for constructing a road from Carbonado to Fairfax for $223,750.

West Virginia

C. C. Thatcher is operating an 18-B Bucyrus shovel for the Fred T. Ley Co. at Fairmont. Mr. Thatcher is operating the machine with a broken ankle but we understand that it is healing rapidly.

Contracts were let on Feb. 7th for fifteen miles of railroad work of the Virginian railroad, calling for 1,000,000 cubic yards of excavation. The work was let in four sections, including two big tunnels. This road is being built in connection with the Raleigh Wyoming Coal Co.

Comrs. of Mingo Co. have let contract for building eight miles along Pigeon Creek, 20 feet wide, involving 90,000 cubic yards excavating, grading and drainage structures to Clay & Doyle, Huntington, $108,410.

Wisconsin

The Winston Brothers Company of Minneapolis, Minn. were awarded a contract on Jan. 6th for the excavation and sub-structure of a new power plant and yard for The Milwaukee Electric Railway & Light Co. on the Lake Shore at St. Francis. The interesting feature of this job is the short time which the contract calls for. Under the direction of Mr. C. H. Whittaker, the Winston Company are going after this with their well-known energy and snap. As stated before the contract was awarded about Jan. 6th. Their 70-C Bucyrus shovel started overcasting into the lake on Jan. 31st and on Feb. 18th was loading cars. Their dragline excavator moved dirt on Feb. 21st. Their equipment consists of a 70-C Bucyrus steam shovel, a Class-20 Bucyrus dragline, 4-yard Petler cars and six 18-ton Petler locomotives. The contract calls for completion of the excavation by April 10th.

E. L. Bumsted has been doing fine work with an 18-B Bucyrus for the Dupont Engineering Company in Janesville. This shovel has been at work on the construction of a storm sewer in connection with the enlargement of the Samson Tractor plant.

PROSPECTIVE CONSTRUCTION

Alabama

Lehigh Portland Cement Co. of Allentown, Pa., it is reported, contemplates building 12 miles of railroad from Gadsden, Ala., to limestone quarries near Colvin Mountains.

Arkansas

Plans are being considered for the construction of an improved highway from Prescott to Willisville, 22 miles with laterals to Rosston, Bodcaw and Sutton.

California

J. F. Collins, city harbor engineer, Long Beach, recommended that the city widen and deepen channels and turning basin, extend jetties and construct wharves, cost $2,496,390. Two alternate plans suggested, one not including extension of jetties, to cost $1,443,350 and other, not including widening two channels, $1,904,590.

The City Council of Stockton has had preliminary plans prepared for new harbor, involving widening channel from 200 to 1,250 feet, building wharves, etc. Estimated cost about $4,000,000. S. A. Judd, Stockton, is engineer.

The California Southern Railroad was authorized by the State Railroad Commission to issue bonds to the extent of $135,000 for the extension of its main line, southwesterly from Blythe, Riverside County, a distance of 7.1 miles to the Palo Verde County.

Canada

There promises to be unprecedented activity in road making throughout the Dominion of Canada during the forthcoming year. This is evidenced by the fact that $20,000,000 has been appropriated for good roads. The cost will be borne sixty per cent by the Provinces and forty per cent by the Federal Government. The former will carry out the work. Ontario already has some work in view as has Quebec. All of the other provinces have plans in course of preparation. Every province will award the contract and supervise the work in conjunction with supervisors.

The Canadian Government has given Kingston, Ont., the assurance that the harbor work will be proceeded with, and will keep step with the work on the Welland Canal. The plans call for an expenditure of $2,500,000. They include the dredging of the approach through the outer harbor to a depth of twenty-five feet, and the dredging of a larger basin north of La Salle causeway in the inner harbor, to the same depth; the erection of dock frontage, with a grain elevator of 400,100 bushels capacity in the operating house; an additional storage capacity, at the outset, of 2,400,000 bushels with provisions for extension; also a complete layout of railway trackage and yards with provisions for speedy loading into river boats.

The Pacific Great Western is considering the relocation of fifteen miles of its line near the Cottonwood river, B. C., which has been subject to continual subsidence, requiring the extensive use of piles and trestles to maintain line and surface.

The Esquimalt & Nanaimo will commence clearing the right-of-way, grading and bridging work on a new branch from near Alberni to the Great Central Lake, a distance of about 10.5 miles. The Foundation Company of British Columbia, Ltd., Vancouver, will do the work.

The Manitoba Good Roads Board approved an application from the rural municipality of Arthur for the co-operating construction of 110 miles of road to cost $237,410. Two bridges for the municipality of Louise to cost $17,270, have also been approved. An extension to the Pembina Highway in the municipality of Fort Garry to be constructed for a distance of 1.73 miles. Said extension will include a bridge over the Siene River, and will cost $63,454.

Chatham and Dover Twps., Ont., had plans prepared and will receive bids about March, for dredging 19 miles of Little Bear Creek Drain, also building several concrete bridges. Work involves 600,000 yd. floating dredge work and 1,000 cubic yards concrete. About $150,000. A. McArthur, Tupperville, clk., G. McCribbin, engineer.

It is planned to expend about $44,000 for road improvements in Bruce County, Ontario. Address D. J. Izzard Co., Railroad Supt., Port Elgin.

Bids will be received in about two months, for roads in Municipality of Grey, Man.; estimate, $186,000. Address O. T. Soole, Clk., Elm Creek.

Colorado

Gunnison County will co-operate with the forest service and the state will expend $30,000 in constructing, widening, grading, constructing culverts and bridges, improving the Crested Butte-Somerset State Highway. This county will also co-operate with the United States and the State of Colorado will reconstruct the Blue Mesa Road on Rainbow Route, from Cebolla to Cimarron at a total cost of $90,000.

Surveys of three federal aid road projects in El Paso County were made by T. J. Mahoney, Chief Engineer of State Highway Commission. The roads to be paved are Colorado Springs to Broadmoor, Colorado Springs to Manitou road and the Breed to Pike View.

Florida

A 26-mile private railroad is planned which will connect the new Miami and Tampa R. R. with the Atlantic Coast Line, according to John J. O'Brien of Moore Haven.

Georgia

Cook County Commissioners will construct 14.79 miles of National Highway, calling for 138,860.4 square yards paving; 1177.5 feet vitrified clay pipe, 15, 18, 24 and 30-in.; 745.11 cubic yards concrete; 17,092 lbs. reinforcing steel; 329,669.10 cubic yards excavation.

It is planned to expend about $300,000 for 11 miles of Decatur Stone Mountain Rd. and 13 miles of Covington Rd. in De Kalb Co. E. V. Camp, at Dalton, is Engineer.

Illinois

East Side Levee and Sanitary Dist. is preparing plans for a drainage canal to run along foot of the bluffs. The estimated cost is $2,000,000. This is part of $10,000,000 project to drain East St. Louis and eliminate Cahokia Creek.

The city of Wauconda plans to build sanitary and storm sewers, involving 10-24 inch pipe. The cost will be about $34,742. J. L. Pickens, Kankakee, is engineer.

Indiana

The city of Rensselaer is planning the construction of F. Guy Barnard Ditch, approximately 1,000,000 cubic yards of excavation.

The Indiana State Highway Commission has approved and adopted the route for the proposed Indiana New Highway around the southern shore of Lake Michigan between the Illinois-Indiana state line and the Indiana-Michigan state line, near Michigan City, and would build the same with the federal aid. The work will cost nearly $1,000,000 and will be 40 miles long, 12 of which will be within city limits.

The State Highway Commission, Indianapolis, plans to build twenty-five miles of road between Gary and Michigan City to be known as Indiana-Dunes Highway. Estimated cost, $1,000,000.

Iowa

Improvements to be launched by Polk County Board of Supervisors during 1920 will amount to more than $1,000,000. The work includes hard surfacing of roads, and the erection of new concrete and steel bridges. F. O. Laing is County Engineer.

Idaho

The Bureau of Public Roads, Missoula, plans to build 4.27 miles North and South Highway from Ilo west in Lewis County, involving 30,000 cubic yards of excavation, to cost about $56,000; 4.26 miles of the Gooding Rupert Highway, Jerome County, 24,-

000 cubic yards of excavation, both crushed rock and surface, to cost $94,000; 16 miles Idaho Central Highway between Arco-Howe, Butte County, gravel surface, 46,600 cubic yards of excavation to cost $90,000.

Kootenai Co. plans to gravel 12.5 miles of the North and South Highway from Harrison to Beauty Bay, involving 100,000 cubic yards excavation. Estimated cost, $197,990.

Benewah Co. plans to gravel 10.9 miles North and South Highway to St. Maries-Kootenai County line, involving 305,000 cubic yards of excavation, about $197,806.

Kansas

The Golden Belt Line, a railroad recently projected, will run through Barton, Rush and Ellis counties, Kansas, connecting the town of Hays with Great Bend and Hutchinson, Kan., with the northern part of the state, a total length of fifty-two miles.

Louisiana

Bids will be received by the State Highway Department, New Orleans, for constructing 38.16 miles of highway, estimated cost of work, $394,665.

It is reported that the Louisiana & Northwest R. R. will build an oil-fields branch 5 or 6 miles long from a point two miles north of Homer, La., with industrial sidings totaling about the same. S. C. Stafford is engineer at Homer.

Bids will be asked within a short time by State Highway Department for constructing a 35.2 mile stretch of the Lake Charles Highway.

Maryland

The city of Cumberland plans the following improvements to extend and improve sewers, streets; build subways and conduits; $1,000,000 in bonds will be voted.

Maine

A railway is planned from Boothbay Harbor to South Newcastle, Me., connecting with the Maine Central R. R; also a bridge from both sides of the harbor to the proposed station. Total estimated cost, about $200,000.

Michigan

The city of River Rouge soon receives bids grading, curbing and paving with concrete reinforced with armor plate protection joints, 10,000 ft. Maple and Burke Aves., and Pine and Henry Sts., 24-30 feet wide, involving 25,000 square yards concrete, total cost about $100,000. G. Jerome, 1331 Majestic Bldg., Detroit, engineer.

Ogemaw soon lets contract grading, draining and surfacing 3.054 miles Assessment Dist. Rd. 1, 9-feet wide, involving 16,128 square yards gravel, 16,976 cubic yards earth excavation, etc.

F. F. Rogers, state highway commissioner Lansing, soon lets contract grading, draining and surfacing 1.002 miles of State Trunk Line Rd. 11-31, 16-18 feet wide, Berrien County, involving 10,562 square yards concrete, or bituminous concrete, 4,644 cubic yards earth excavation, 9,389 square yards waterbound macadam, 110 lin. ft. 12-in. encased tile, 19.1 cubic yard; 1:2: 4 and 49.2 cubic yards, 1:3:6 concrete, 1,306 pounds reinforcement, etc.

State Highway Dept., Lansing, soon receives bids building 16.614 miles Federal Aid Project 38, 18 feet wide, Fort Gratiot Turnpike, St. Clair County, 21.892 miles Federal Aid Project 43, Casnovia Rd., Muskegon County; also 10.058 miles Federal Aid Project 41, Saginaw Rd., Oakland County, all 18 feet wide, cement or bituminous concrete.

Bids will be received until March 10 by F. F. Rogers, state highway commissioner, at office of the Bd. of Rd. Commissioners Genesee County, Flint, grading, draining and surfacing 5.447 miles State Trunk Line Road 21-3, 18 feet wide, involving 57,516 square yards vitr. brick, concrete or bituminous concrete, 24,414 cubic yards earth excavation, 5,964 lb. steel reinforcements, etc.

The State Highway Department, Lansing, plans to grade, drain and surface with gravel 5.509 miles State Trunk Line Road 21-1, 16 feet wide, Clinton Co., 22,505 miles Michigan Federal Aid Project 44, 9.163 miles with 16 feet gravel and 13.342 miles with 18 ft. concrete or bituminous concrete, also 10.482 miles of State Trunk Line Road 34-1, 18 ft. wide.

Samuel Rea, president of the Pennsylvania Railroad system, informed Detroit business men recently that the company is prepared to complete the $15,000,000 extension of its lines to Detroit from Toledo as soon as the railroads are assured of legislation in Congress providing an adequate basis of credit.

Final survey of the Michigan Northern R. R. has been completed by Esselstyne, Murphy & Hanford, Detroit engineers, and the road is to be constructed this spring.

Bids will be received until 1:30 p. m., March 10, at office of Board of County Road Commissioners, Genesee County, Court House, said city, for improving 5.449 miles of road in Clayton and Flint Twp.

Mississippi

Bolivar County Commissioners, Lead Bayou Drainage Dist., will construct 32 miles of canals and ditches on 22,000 acres; 166,-100 ft. total excavation; 1040 ft. clearing right-of-way; $175,000. Robt. A. Murdock of Michigan has contract for drainage work; Sol Sellbinder, Cleveland, Miss., for clearing right-of-way; W. W. Boone, Engineer, Shelby Bldg., Cleveland.

It is reported that plans are under way to build a 7-mile connection between the McLain branch of the Gulf Mobile & Northern R. R. and the railroad of the Wausau-Southern Lumber Co. L. W. Duffee is chief engineer of the Gulf Mobile & Northern at Laurel.

Missouri

No bids were received February 4, by County Clerk of the State Highway Board at Liberty for grading, constructing culverts, bridges, broken stone, base and bituminous macadam on State Road from Liberty to Excelsior Bridge 13.5 miles.

Citizens of Marshall will vote March 9, on the proposition of improving 288 miles of road at a cost of $1,800,000.

Nodoway Co. is having plans prepared paving 38 miles of Jefferson Highway, near Maryville, 18 feet wide, concrete. Leslie-Barnes Engineering Co., American National Bank Bldg., St. Joseph, engineers.

Platte Co. is having preliminary plans prepared paving 26 miles Jefferson Highway, 18 feet wide, probably concrete. Leslie-Barnes Engineering Co., American National Bank Bldg., St. Joseph, engineers.

Atchison Co. is having plans prepared grading 50 miles of State road, north and south, 18 feet wide, About 100,000. Leslie-Barnes Engineering Co., American National Bank Bldg., St. Joseph, engineers.

Road Advisory Committee of St. Joseph recommends the immediate construction of roads in this county; eight definite projects are planned involving approximately 120,000 miles of hard surfaced roads to be constructed under the $2,000,000 road bond issue. John D. Mohler is Highway Engineer.

The Burlington R. R. considers the improvement of Hannibal R. R. yard at a cost of $500,000.

Salt Fork D. D. rejected bids received Jan. 17, building 21 miles drainage ditch, involving 1,731,000 cubic yards excavation. About $700,000. Elliott & Harmon Engineering Co., 144 Fredonia St., Peoria, Ill., engineers.

The Ingham Lumber Co. of Kansas City, contemplates building a 30-mile standard-gauge railroad to timber holdings on Little River in Pushmataha county.

State Highway Department, Jefferson City, plans to build 13 miles Greenville-Poplar Bluff Road, 24 feet wide, Butler Co., involving 38,000 cubic yards earth and 2,000 cubic yards rock excavation, 10 miles grading, 66,000 square yards gravel and 2,640 square yards concrete surfacing, 9 feet wide, 27 culverts and one 30 ft. span bridge, cost $80,344; 10.46 miles Jefferson Highway, 24 feet wide, Athens Twp. Bd., Gentry Co., 138,600 cubic yards earth and 1,400 cubic yards rock excavating, 98,188 square yards gravel surfacing, 16 feet wide, 47 culverts, 1,050 lin. feet guard rail, $210,947; 8.1 miles Preston-Collins Road, Weaubleau Special Road Dist., 31,360 cubic yards earth and 640 cubic yards rock excavating, 76,035 square yards two course gravel surfacing 16 feet wide, and 21 culverts, $56,141; 6.7 miles Springfield-Sedalia Road, Cross Timbers Special Road Dist., 20,000 cubic yards earth and 400 cubic yards rock excavating, 35,376 square yards two course gravel surfacing, 9 feet wide, 22 culverts, one 30 ft. concrete girder span and one 20 ft. concrete slab span, $36,245, both 24 feet wide, Hickory Co., 2.1 miles Washington Park Blvd.-

Kansas City Road, 32 feet wide, Jackson Co., 75,200 cubic yards earth and 4,800 cubic yards rock excavating, 40,000 cubic yards borrow, 42 culverts and one 110 ft. concrete arch bridge, $129,059; 4 miles Joplin-Springfield Road, 24 feet wide, Jasper Co., 1,500 cubic feet earth excavating, 21,120 lin. ft. grading, 42,240 square yards concrete paving, 18 feet wide, and two culverts, $88,000; 22 miles Springfield-Joplin Road, Mt. Vernon Special Road Dist., 24 feet wide, Lawrence Co., 22,560 cubic yards earth excavating, 43,180 square yards 10 in. and 154,885 square yards 5 in. gravel surfacing, 16 feet wide, 87,000 lin. ft. grading and 29 culverts, $83,000; 6.7 miles La Belle-Lewiston Road, La Belle Special Road Dist., 22,400 cubic yards earth excavating, 62,891 square yards 10 in. gravel surfacing, 16 feet wide, 10 culverts and one 28 foot span concrete bridge, $68,016, 4.25 miles La Belle-Monticello Road, Lewistown Special Road Dist., 14,500 cubic yards earth excavating, 39,893 square yards 10 in. gravel surfacing, 16 feet wide, 6 culverts and one 20 ft. concrete span bridge, $44,654, both 24 feet wide, Lewis Co., 4.5 miles London-Perry Road, 6,192 cubic yards earth excavating and 23,760 square yards 10 in. gravel surfacing, 9 feet wide, $17,820, 13 miles Red Ball Route, 58,998 cubic yards earth excavating, 68,640 square yards 6 in. gravel surfacing, 9 feet wide, 8 culverts and one 65 ft. steel truss bridge, $51,480, both 26 feet wide, Ralls Co.; 2.27 miles Hollister-Branson Road, Branson-Kirbyville Special Road Dist., 2,940 cubic yards earth and 599 cubic yards rock excavating, 3,984 lin. ft. grading, 16,595 square yards gravel surfacing, 16 feet wide, 182 lin. ft. 15-24 in. vitr. pipe culverts, 206 cubic yards dry and 46 cubic yards cement rubble masonry, 1,990 feet b. m. timber, 3,120 lb. rein. steel and 1,745 lin. feet 12 x 14 in. coping wall, $10,490, 1.83 miles Hollister-Branson Road, Hollister-Kirbyville Special Road Dist., 8,421 cubic yards earth and 655 cubic yards rock excavating, 2,482 lin. feet grading, 17,059 square yards gravel surfacing, 16 feet wide, 105 lin. feet 15 and 24 in. vitr. pipe culverts, 422 cubic yards rubble masonry, 4,050 lb. rein. steel and 1,800 lin. feet 12 x14 in. coping wall, $13,020, both 20 feet wide, Taney Co.

Montana

The State Highway Commission is advertising for proposals from contractors to construct highways under the joint co-operation of the counties and federal aid. These bids will be opened on March 2nd and 12th at two different lettings.

Approval of an additional highway project for a north and south road leading out of Kalispell and on the west side of the Flathead River has been given by the officials of the State Highway Commission.

Helena Valley Irrigation Project, Lewis & Clark Counties, plans to irrigate 40,000 acres. Work involves 45 miles canals and purchase of two pumping plants now being operated. Cost about $600,000. A. W. Verharen, 18 Kohrs Bldg., engineers.

Bids will be received until 2 p. m., March 12, by the Executive Committee of the State Highway Commission, Capitol Bldg., said city, for construction of highway known as Federal Aid Project No. 4, John C. Edy, Chief Engineer.

Custer Co. election April 23, to vote on $350,000 bonds to build roads. The Federal Government will be asked to appropriate toward cost. J. N. Edy, care of State Highway Dept., Helena, engineer.

Bids will be received until March 12, by State Highway Dept., Helena, grading, paving and draining 4.91 miles. Yellowstone Trail running northwest from Bozeman, Gallatin Co., Federal Aid Project 44, involving 34,000 cubic yards common excavating, 51,628 square yards paving, 235 cubic yards concrete structures and 15,900 lbs. reinforcing steel. Alternate bids will be received on one course portland cement concrete, portland cement concrete base, be received on one course portland cement concrete base and bitulithic top. J. N. Edy, state highway engineer.

Minnesota

It is planned to grade two roads in Wilkin Co., near Breckenridge 19 and 4 miles long; estimates, $95,000 and $20,000, respectively. F. O'Meara, Co. Engineer, Breckenridge.

Grading and graveling planned on about 9 miles of road between Detroit and Calloway; estimate $54,000. H. W. Teague, Co. Engineer of Becker Co., Detroit.

It is planned to expend about $155,199 for paving London Road, Duluth. Address City Clerk.

Grading and graveling planned on two roads in Rice Co., 12.2 and 7 miles long; estimates, $72,000 and $42,000, respectively. W. P. Chapman, Co. Engineer, Faribault.

Grading and graveling planned on 12 miles of road south of International Falls, estimate, $72,000. L. A. Ogard, Co. Engineer, International Falls.

Grading and graveling planned on 23.5 miles of road near Marietta and on 8 miles near Madison, Lac Que Parle Co.; estimates $141,000 and $48,000, respectively. F. Foe, Co. Engineer, Madison.

It is planned to expend about $110,000 for grading 22 miles of roads in Blue Earth Co. Address Co. Engineer, Mankato.

It is planned to grade 27 miles of road leading east from Moorhead to county line; estimate, $135,000. Address P. F. Stary, Co. Engineer, Moorhead.

Fillmore Co. plans to grade 8.3 miles of road near Preston; estimate, $41,000. W. Dunbar, Co. Engr., Preston.

Bids will soon be re-advertised by Ramsey County Commissioners for grading, laying and graveling Bellaire Ave., from Lake Johanna and Wildwood Roads to White Bear Lake.

Grading and graveling planned on about 18 miles of road leading north from Albert Lea; estimate, $108,000. Address E. V. H. Brown, Co. Engineer, Albert Lea.

It is planned to expend about $153,000 for grading and graveling 26 miles of road in Anoka County. Address H. H. Thurston, Co. Engineer, Anoka.

New Hampshire

Public service Commission has authorized the issuance of over $10,000,000 in bonds by Boston and Maine R. R. Over $7,000,000 of this sum to be used for improvements now under consideration in this state.

New Mexico

Sidney M. Wells, of the San Miguel Mining Co., Albuquerque, N. M., has announced that a railroad is to be built into Cuba county, about 70 miles, in the near future.

North Carolina

Hassinger Lumber Co. of Konnarock, Va., will, it is reported, build a railroad to develop timber land in Ashe county.

New York

A $20,000,000 connecting railroad, to act as a clearing-house for the freight cars of a half dozen roads entering or passing through the port of New York from both sides of the Hudson river, is proposed by the New York & New Jersey port commission. The road is to link trunk lines terminating on the New Jersey shore and those on the New York side of the Hudson at Piermont, N. Y., and will extend from Piermont, near Nyack, N. Y., to Elizabeth, N. J., on Newark bay. It will be 45 miles long, double tracked. It is proposed that each line take its share of the capital stock of the connecting road.

Ohio

The city of Cleveland soon lets contract dredging Cuyahoga River, involving 85,000-180,000 cubic yards excavating. Estimated cost, $30,000. R. Hoffman, city engineer, Cleveland.

About 26 miles of roads planned in Tuscarawas Co.; estimate $900,000 to $1,000,000. Address County Surveyor, New Philadelphia.

Oregon

Douglas Co. plans to expend $84,000 for grading, graveling and paving county roads, and $28,000 for graveling market roads. Address Co. Judge at Roseburg.

Tumalo Irrigation Dist., represented by F. N. Wallace, filed application with P. A. Cupper, state engineer, Salem, to appropriate 50,000 acre ft. water to be taken from west fork of Deschutes River and stored in Crane Prairie Reservoir for irrigation of 12,500 acres in district; will also build canals, laterals, flood gates and flumes. Cost estimated at $50,000.

Oklahoma

The Oklahoma Southwestern R. R. Co. is in the process of incorporation and will build a new line between Okmulgee, Okla.

and Bristow, running into an undeveloped oil country. The new company is to be capitalized at $2,000,000, but it is expected that the construction and equipment of the road will cost at least twice this amount. The main line will be approximately 35 miles long and will connect at Okmulgee with the St. Louis-San Francisco and the Okmulgee Northern. Connections will be made at Bristow with the Frisco Lines. The temporary offices of the company are at Miami, Okla.

The Chicago, Rock Island & Pacific will build its own line into Wichita Falls, according to a recent announcement, and a survey from Waurika, Okla., to that city will be started shortly. As soon as the survey is finished and the right-of-way secured, construction will be commenced. The extension, which will be about 40 miles long, will give Wichita Falls and a big area a direct transportation outlet to important towns in Oklahoma. This road will also erect a brick and stucco station at Grandfield, Okla.

Preliminary Surveys will be started at once on 17 miles of gravel road in Wagoner County. Bert Hallen, County Surveyor, Muskogee.

The new Southwestern R. R. contemplates the construction of a new road 40 miles long between Bristow and Okmulgee.

Pennsylvania

The Citizens Electric Co., Valley View, Pa., plans to grade cinder roadbed and lay 20 miles of track from Ashland to Klingertown, involving 24 grade crossings, 10,000 poles, 40 miles of rail, 100-pound 50-foot rails, electric trolley line, etc. Estimated cost, about $350,000.

The city of Philadelphia plans the improvement of South Philadelphia, eliminating the many grade crossings by elevating R. R. tracks.

Texas

Plans are under way for the extension of the Roby & Northern R. R. from Roby to Sweetwater, a distance of about 50 miles.

Grading, draining, graveling, etc., planned on 19.03 miles of road in Harrison Co., estimate, $284,684. G. A. Duren, Co. Engineer, Marshall.

The Fort Worth & Mineral Wells Railway Company is planning a line from Fort Worth to Mineral Wells, Tex., a distance of about 60 miles, and the Fort Worth, Mineral Wells & Breckenridge Railway Company, a line from Mineral Wells to Breckenridge, a distance of about 55 miles. H. E. Robinson of Fort Worth is president of both companies.

The Gainesville-Sherman Traction Company will shortly be incorporated with a capital stock of $1,500,000 to build a line about 40 miles long from Gainesville east to Sherman, Tex., via Callisburg, Whitesboro, Sadler and Southmayd. It is also contemplated to build eventually in the opposite direction from Gainesville west to Montague, Tex., a distance of approximately 45 miles, via Lindsay, Myra, Muenster and Saint Jo. George M. Easley is to be president of the new Gainesville-Sherman Company.

Delta Co. is having plans prepared grading, surfacing and draining 11.3 miles Highway 19, from Cooper to Lamar Co., 16 feet wide, involving 20 acres clearing and grubbing, 6,673 cubic yards crushed rock and gravel, 61,350 cubic yards earth excavating, 1,534 cubic yards concrete paving, 77,548 pounds reinforcing and 196,604 pounds structural steel, 588 cubic yards 1:2:4 and 608 cubic yards 1:2½:5 cubic yards concrete. Cost about $306,500. Cock & Nagle, Cooper, engineers.

Tom Green Co. is having plans prepared grading, draining and surfacing with waterbound macadam, 41 miles Highway 9, known as Sterling City-Merita Road, 16 feet wide, involving 50 acres clearing and grubbing, 57,143 cu. yards unclassified earth, 2,000 cubic yards rock and 500 cubic yards structural excavating, 80,000 pounds reinforcing steel, 500 cubic yards 1:2:3, 900 cubic yards 1:2:4, and 500 cubic yards 1:2½:5 concrete, etc. Cost about $315,206. J. E. Beavers, San Angelo, engineers.

Smith Co. is having plans prepared grading, surfacing and draining 24.6 miles Highway 15, from here to Gregg Co., 16 feet wide, involving 45 acres clearing and grubbing, 4,500 cubic yards gravel, 125,000 cubic yards earth excavation and 2,300 cubic yards concrete in culverts. Cost about $245,000. D. K. Caldwell, Tyler, engineer.

Fort Worth County has sold $3,400,000 worth of bonds to provide for road and bridge work to include the construction of approximately seven miles of concrete pipe along north side of Texas Pacific Track.

Eastland County contemplates the construction of 200 miles of road to cost $5,000,000.

Bond issues totaling $1,785,000 are available for good road work in 1920, in seven West Texas Counties lying along the Del Rio-Canadian State Highway No. 4.

Sealed bids will be received at the office of W. A. Randle, Engineer Road District No. 23, Freeport, Texas, until noon, March 13, 1920, for the grading and bridge work on 9.44 miles of State Highway No. 36. Grading is divided into four sections; bids may be submitted on all or on any section. Separate bids for bridges will be received.

Approximate quantities: Section No. 1, 35,000 cubic yards embankment. Section No. 2, 8,000 cubic yards, grader work. Section No. 3, 50,000 cubic yards, embankment. 325 lineal feet pile bridges. 206 cubic yards, concrete bridges.

Plans may be examined at Engineer's office, Freeport, Texas, or at State Highway Department, Austin, Texas. Specifications, proposal blanks and layout map may be obtained from Engineer at Freeport, Texas.

Utah

The Salt Lake and Denver is the name of a company organized to construct a railroad from Provo, Utah, to a connection with the Denver & Salt Lake at Craig, Colo., a distance of approximately 310 miles. Simon Bamberger is president of the company.

Bids will be re-advertised by State Road Commission for construction of approximately 4½ miles of highway between Payson and Spanish Fork, approximately 18 feet wide.

Approval has been given by State Road Commission to the post road project between Cedar City and Lund. Work will be started soon.

Washington

The city of Seattle plans to expend about $1,540,140 for grading, $3,257,600 for paving and $217,400 for concrete sidewalks.

The Entiat Reclamation Dist., recently organized, plans to build concrete canal, 7 miles long, volume carrying capacity of 1000 miners inches of water to irrigate flat lands in Entiat Flat. Bonds for $60,000 will be voted for project.

Commission of Engineers appointed by the State Reclamation Board have submitted plans for the Methow-Okanogan Irrigation Project in Okanogan County. The units under consideration comprise 22,900 acres of land. Estimated construction cost, for case wooden flumes at $254 an acre, and metal flumes at $279, or reinforced concrete construction at $304 an acre.

Wyoming

Plans for the reconstruction of the Greely and Fort Collins Road are being prepared immediately, and bids will be asked early in March. Both roads to be rebuilt from the Cheyenne city limits to Colorado State Line. Engineers of State Highway Department will begin the relocation of the Cheyenne-Torrington Road.

The State Highway Commissioner will receive bids early in May on road construction projects valued at $1,500,000. Bids will also be asked about April 1st for the construction of road valued at $1,000,000. D. S. McCalman, Cheyenne, State Highway Superintendent.

West Virginia

The Virginian-Wyoming Ry. Co. has invited bids for the construction of 14½ miles of line in Wyoming county. H. Fernstrom, Norfolk, Va., is chief engineer.

Issue of $250,000 bonds has been voted in Morgan Co., for 17 miles of road between Paw Paw and Bath. F. Hawkins is county Road Engineer.

The Morgantown & Wheeling R. R. Co., Thomas S. Barrett, president, which is now planning to extend its line into Fairmont, W. Va., is reported concentrating its efforts toward the ultimate extension to Waynesburg, Pa., with the idea of making a route through to Pittsburgh, as follows: Fairmont to Mannington, 18 miles; to Blackville, 18 miles; to Waynesburg, 12 miles; to Bridgeville, 35 miles, going thence 12 miles to Pittsburgh over the Pittsburgh & West Virginia R. R.

The Morgantown and Wheeling Railroad Company will build thirty miles of railroad during the coming season. Contractors who are interested should address at once, Thos. F. Barrett, president of the Company, Mannington, West Virginia.

Bids will be received until March 8, by C. E. Mahan, clk., Fayette Co., for grading and draining 7 miles road from Hico to Ansted, Mt. Cove Dist. and 6 miles road from Prince to Hemlock, Quinnimont Dist., J. K. McGratt, Fayetteville, engineer.

Proposals desired for stripping coal land and excavating coal with steam shovels near Clarksburg, West Virginia. About 30 acres of land with overburden averaging approximately 14 feet with a 10-foot vein of coal. Property adjoins railroad and tipple together with siding will be furnished. For information communicate with D. R. Potter, care of Thornton Fire Brick Company, Clarksburg, W. Va.

Commissioners of Wood Co. are having plans prepared by B. Woodyard, engineer, Parkersburg, for surfacing 2 miles Stanton-Parkersburg Pike, 16 feet wide, involving 19,000 square yards concrete and 12,000 cubic yards excavating. About $70,000.

Wisconsin

It is reported that the Chicago, Milwaukee & Gary R. R. is considering the construction of a line from Milwaukee to Rockford, Illinois.

Chilton is having plans prepared for excavating and laying vitr. pipe sewers and paving Madison, State, Court and Grand Streets, to cost about $30,000. J. Donohue, North 8th St., Sheboygan, engineer.

The plans prepared for Milwaukee's outer harbor by H. McL. Harding of New York, the consulting engineer of the harbor commission, have been accepted by the commission. They provide for the improvement of the lake front from Wisconsin street to the harbor entrance and for the improvement of Jones island on either side from the sewage disposal plant to Wilcox Street. Docks will be built and about $500,000 a year expended. These improvements, which will be completed by the construction of cement docks, equipped with cranes for handling freight, will add fourteen miles of additional water front to Milwaukee's harbor, and Engineer Harding predicts that the commerce of the port will have increased so by the time the improvements are completed that the city will have to begin at once on another program of expansion of its harbor facilities.

Foreign

Chile

The projects for roads and railways in Chile include the building of a new road from Collipuli to La Esperanza at an estimated cost of 32,000 pesos; a railway from Santiago to Valparaiso via Casablanca, to complete the necessary surveys for which 80,000 pesos have been appropriated, and a railroad from Nocopulli to Dalcafrue. Moreover, the government plans to electrify the line from Valparaiso to Santiago and desires bids for this purpose.

Mexico

Construction on the railway line to connect the city of Durango with the port of Mazatlan is progressing favorably. The line will traverse some of the richest centers of Mexico. Both the state legislatures concerned have appropriated large sums with which to finish the work, and the opening of traffic through that district will probably be followed by considerable commercial activity.

Nicaragua

Despatches from Managua, Nicaragua, say that negotiations for the raising of a loan of $10,000,000 have been completed. The money is to be used to improve the highways of the principal departments of Nicaragua and to construct a railroad from west of Matagalpa to the Altantic seaboard. One railroad building company, the advices state, has offered to construct the railroad in three years.

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The above photograph shows the new Bucyrus spreader plow, owned by the Oliver Iron Mining Co., successfully spreading heavy clay, frozen for four days at 20° below zero on the dumps of this Company at Hibbing, Minn. (operating on 60 lb. rails).

The Bucyrus spreader plow will do this, stand the racket and hold the track under most adverse conditions.

Heavier, stronger and more massive in construction than any spreader ever built.

Weight 68 tons, 60% steel casting.

Greater maximum width of spread than any spreader built — 12 to 22½ ft.

It can spread 16″ below the rail. It can cut from any point from 24″ below to 19″ above the rail.

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UMI

Class 20-Bucyrus Dragline Excavator Moving Away from the Inland End of the Pit Where it Has Been Engaged in Excavating a Shelf for the Temporary Concrete Bin

70-C Bucyrus loading 4-yard Western Cars. The Class-20 in the background had been assisting the 70-C by excavating 75 feet of the end of the cut in order to allow tail room for the cars. The material piled to the left was excavated by the dragline from the shelf above mentioned.

Excavation Under Way for The Milwaukee Electric Railway & Light Co.'s New Power Plant, South of Milwaukee
Winston Bros. Co., Minneapolis, Contractors